COMPUTERWORLD

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Pontiac salesman Robert M. Ward, (right) of King Pontiac, Gaithersburg, Md., inaugurates Pontiac's new car delivery status report for his customer, Joseph D. Donahue (seated). Assisting is Shirley Ward, King Pontiac secretary, who uses a computer terminal to question General Electric's computer network on the status of Donahue's order.

GE Boosts Flexibility With T/S Net Options

By a CW Staff Writer

BETHESDA, Md. – The General Electric time-sharing network is now offering a series of capabilities designed to extend flexibility without additional cost.

The changes range from a new means of finding out network information and new services to a Fortran IV debugging package. Available to some GE users since early October on a test basis, the new capabilities can now be used by Mark I, Mark II, and Network Service users, GE said.

Maximum program size capacity has been doubled to 32,000 words of core memory. This feature makes programming easier and faster because the user does not have to plan as many overlays as before.

Processing should be faster and cheaper as well, a spokesman noted, since the time – and cost – formerly involved in chaining stored program segments together to accommodate

(Continued on Page 2)

SBC Switches to 370s

NEW YORK – Service Bureau Corp. (SBC) has started to use IBM 370/155s in place of 360/50s for its national time-sharing system and, in celebration, has renamed the service Call/370.

Although there is complete data file and program compatibility with the previous Call/360 service, Call/370 is expected to provide users with "substantially improved" response time, improved reliability and greater information storage for large data base applications.

Most Users Within an Industry Spend Equally on DP: Diebold

By E. Drake Lundell Jr.
Of the CW Staff

NEW YORK – Computer users within industries generally spend about the same percent of revenues on DP, whether they are large or small firms.

That is one of the major conclusions drawn from a recent study conducted by the Diebold Research Program – a study which also explodes the myth that the more money allocated to computer use the faster the company's growth.

"Comparison of spending patterns by industry appears to be far more meaningful than comparison by size or by any other variable," the study shows, adding that "in many of the industries studied there appears to be a uniformity of approach among competitors, irrespective of size."

Biggest Not Always Largest

The study reports there is "little relationship between company size and data processing budgets." Large companies, Diebold said, "do not systematically allocate a larger percentage of sales to ADP, nor do they tend to spend their ADP dollars significantly differently than smaller companies."

In the area of growth, the study said "corporate growth rates do not appear to be related to data processing spending, either in terms of the size of the budget or the way in which it is allocated."

At the same time, however, the size of the DP budget seems to be "closely" related to the type of control a company places over the DP function, the study shows.

"Generally, those companies with centralized control allocate substantially less money to data processing than those with decentralized control," it said.

Average Expenditures

The study of 245 corporations in six major industrial classifications, stated the average DP expenditure was 0.9% of corporate sales in manufacturing companies, with a high of 2.23% for aerospace and defense firms and a low of 0.44% for food and beverage companies.

The typical manufacturing company spends 66 cents for hardware for every $1 spent on DP staff, the study shows. Transportation firms spend 90 cents on hardware for every personnel dollar and distribution companies spend 67 cents for hardware for every dollar allocated to DP personnel.

In only one case was the percentage reversed – the airlines. In this category, the firms surveyed spent $1.33 for hardware for every dollar spent on personnel.

The average data processing staff as a percentage of the total work force was highest in banking, the study showed, with 6.43% of the overall workforce being DP people.

In manufacturing companies, 1.34% of the workforce was DP personnel (ranging from 2.39% in aerospace and defense firms to 0.78% in forest products and packaging companies). In distribution firms, 1.52% of the workforce were DP people and in transportation firms, 1.09% of the workers were DP-related.

The average manufacturing company employs "about 550 persons in its data processing function," the study found.

A typical industrial DP budget, according to the study, is divid-

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Hardware Modified To Ease Debugging

By Don Leavitt
Of the CW Staff

AKRON, Ohio – A debugging system that "reverses nearly every approach normally used" in developing on-line programs, and locates bugs in a fraction of the time required by older methods, has been patented by The Goodyear Tire and Rubber Co.

The combination hardware/software system recently took only seven minutes to find and identify a bug in a 2,200 instruction program.

The problem had not been solved in seven weeks of conventional debugging effort, according to Robert S. Enabnit, inventor of the new system and head of Goodyear's electronic research section.

The Goodyear patent covers changes to two printed circuit boards and to the operating system of a DEC PDP-8 which, in effect, make the computer do much of the work normally done by the programmer. The concepts involved could be applied to any mini, Enabnit said.

Enabnit's hardware changes cause the mini to store the instruction address and accumulator contents in a push-down stack as each step is executed. His software turns control of the machine over to an interrupt handler if the program halts abnormally, reaches an address flagged by the user or alters a data field beyond set limits.

Five Prior Instructions

In any of these conditions, the interrupt handler prints the then-current instruction address and accumulator contents. It then prints, in reverse sequence, the addresses and accumulator contents of each of the five instructions executed just prior to the one that triggered the interrupt.

This much information is usually enough to identify the problem, Enabnit said, but his system provides an alternate form of tracing an error. At the user option, it will print the addresses and accumulator contents for the five Branch instructions executed prior to the step that caused the interrupt.

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3 Strikers Charged

System Sabotaged by Phone

By Michael Merritt
Of the CW Staff

NEW YORK – The extensive computer communications network of Metropolitan Life Insurance Co. has been the victim of sabotage, allegedly by union members striking against Met's computer vendor, Honeywell.

By telephoning a tape recording of the signals used by a central computer to poll remote data stations, the saboteurs managed to prevent the printout of processed data in some 25 local Met offices.

No data was actually lost and there was no physical damage, noted John Falzon, Metropolitan's vice-president in charge of electronic installations.

But information flow at 25 offices in the Westchester, N.Y., area was blocked for about a month, forcing the company to use a messenger service to the affected offices, he said.

Metropolitan is considering several possible safeguards for the system, he added.

The striking workers are all involved in maintenance of the data stations, designed specifically for Metropolitan, Falzon said.

Three striking workers were charged with aggravated harassment, a misdemeanor, in connection with the sabotage.

In the Metropolitan system, data is recorded during the day at local offices on paper tape. Starting at about 4:30 p.m., the central computer, a Honeywell 1800, begins polling the remote stations by telephone.

In doing this it reads the tape forward, absorbs the data, and then rewinds the tape. After a night of processing bill payments, address changes, loan requests, etc., the CPU again polls the stations to print out responses to the input data.

Terminates Contact

For purposes of identification, it rereads the entire punched tape. Unless it gets a check with

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THE COMPUTER CARAVAN

The Midwest Computer Users' Forum and Exposition Is Coming To

CHICAGO

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On April 18, 19, 20

BE THERE

Met Life's Remote Poll Upset by Phone

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its previous reading, it terminates contact and tries again later.

This, apparently, is the weak point the suspects struck at. After the first polling, they dialed up the local offices and played the recorded command to read the tape forward.

They didn't give the command to rewind, though, so when the CPU tried its echo check, it found a blank tape and broke off.

And when the offices opened in the morning, there was nothing on the data stations' printers.

The central computer is programmed to log the identity of stations that couldn't be reached after several tries, and soon someone at Met noticed the high incidence of failure in the Westchester area.

Investigation by Honeywell and the telephone company showed the system should have worked properly. So a clerk was left in an office overnight, and at about 12:15 he noticed an unauthorized read on the data station, Falzon said.

Trap Set

The Westchester district attorney's office was called in, and through the cooperation of the telephone company, a trap set. The suspects were caught with tape recorders, making the calls from their union hall, Falzon said.

A Honeywell spokesman said the company had no comment on the specific charges, and it is continuing negotiations with the striking local.

The Metropolitan system has about 900 local data stations tied into polling networks. Only those for which the strikers had phone numbers were affected, Falzon said. Neither Metropolitan nor Honeywell preferred charges against the suspects.

Aggravated harassment is the charge generally used in New York for prosecuting perpetrators of obscene phone calls.

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CONTROL DATA CORPORATION

GE Adds to T/S Net Flexibility

(Continued from Page 1)

larger programs is largely eliminated.

GE's "Editor" program has been extended to include global corrections. With this feature, single letter string editing commands can be used to alter anything from a character to a complete file in storage.

Source programs in any of the languages supported by GE and Ascii data files can be altered with this housekeeping routine, the company said.

Fortran users have two new features. An interactive Fortran IV debugging package is said to significantly improve the efficiency of on-line program development.

It allows examination of a program during execution, by halting it at predetermined points or when errors occur. The programmer can then trace program execution by line number, statement, variable name or control transfer.

Core, Disk Transfer

Another new Fortran feature allows the transfer of data directly between core and disk files. Bypassing the normal system of I/O buffers, this feature allows improvements in program running time, according to GE.

A new Hot Line information system enables users to obtain system summaries and detailed operating instructions on new features, at their terminals, without cost.

Users Within Industry Tend to Spend Equally

(Continued from Page 1)

ed along the following corporate lines: finance and administration, 31%; manufacturing, 24%; marketing, 14%; distribution, 11%; R&D and engineering, 8%; personnel, 4%; corporate planning, 2%; and other applications, 6%.

The typical manufacturing firm surveyed spends nearly $4 million per year on hardware rental and purchase and more than $6 million on its DP staff, the study found.

Of this, the typical budget allocated 30% to new systems development; 60% to on-going applications, and a hefty 10% to conversions.

Annoyed Recipient Takes Survey

Most People Pay Overcharges on Computerized Bills

By a CW Staff Writer

MADISON, Wis. – Most people who experience problems with incorrect bills issued by computerized systems quietly pay the bill even if they feel they are being overcharged, according to a limited, random and probably biased survey here.

While the author of the random study won his battle over an incorrect bill – with the assistance of two U.S. senators and a congressman – he feels that the public attitude shown by the sample may mean that the war with such systems has already been lost.

Dirk S. Faegre, angered by an overcharge on his bill from Unicard, circulated a petition at a shopping center here and found that 70% of the "50 to 60" people he sampled had experienced problems with computer billing systems.

More alarming, however, he found that 90% of those who had experienced such problems had settled the issue by paying what they thought was an overcharge.

Faegre's sample may be biased, it should be noted. Where he found that 70% of the respondents had problems with billing systems, a recent nationwide survey by Afips and *Time* found that 47% of the people surveyed felt "computers often make mistakes when processing bills." But the survey shows only 24% of the respondents had problems correcting such bills.

Faegre was able to correct his problem of a steady stream of monthly bills from Unicard, each 50 cents larger than the previous one, but only after several telephone calls and registered letters to Unicard.

Letters on his behalf from Senators William Proxmire and Gaylord Nelson and one from Robert Kastenmeier, his representative, finally brought the incident to a halt, said Faegre, a programmer with Mid-West Bankshares, Inc. here.

In December, 1969, while living in a Boston suburb, Faegre made a purchase that totaled $12.71. Unicard billed him double that, or $25.42. He paid the $12.71 and attempted to explain the mistake.

The following month he was billed for the remaining $12.71 and 50 cents interest. Finally in June, he was credited for the overcharge but billed for $1.50 in unpaid interest.

Besides relying on his senators and congressman, Faegre borrowed $150 on the credit card and announced he would return it when the $1.50 charge was removed.

Faegre also flew to Washington, D.C. to testify before the Senate Subcommittee on Financial Institutions that was conducting hearings on an amendment to the Truth in Lending Act, commonly called the Fair Credit Billing Act.

Unicard settled its difficulties with Faegre by sending him a check for $10 and explaining, "Seemingly there is no solution" when billing computers go awry.

Besides explaining the $10 did not come near covering the expenses he incurred in the battle with Unicard, Faegre added that he did not accept the explanation offered.

He has a similar problem with another company and believes that, unless the Fair Credit Billing Act becomes law in a hurry, he will have to enlist the aid of his representatives for a second time.

As long as the public would pay the bills without question, he felt there was little that could by done to stop the firms from operating such a system.

NYC Parking Bureau Heeds Public Cries, Remedies Files, DP

NEW YORK – The more than 200,000 people issued incorrect parking tickets with the aid of a DP system used by this city's Parking Violations Bureau can take heart. Their cries have been heeded. Something is being done to correct the system.

Until recently, it seemed pointless to protest notices of parking fines owed. Attempts to telephone the bureau usually resulted in busy signals, and letters went unanswered.

Failure to pay a fine, which could eventually total more than $40, could mean loss of license registration for New York residents and long periods of harassment for drivers from Connecticut and New Jersey. These two states have stopped supplying the bureau with information on its residents.

Anthony Atlas, director of the bureau, pointed out that the 200,000 "errors" were normal for a system of this type and size. Over 100,000 parking tickets are processed weekly by the system, which has been in use almost a year and a half.

The problem involved the computer used by the bureau, the police who write the tickets, and records at the Motor Vehicle Department in Albany, N.Y., he said.

Few people agreed with Atlas and controversy continued. City newspapers regularly carried stories of system foulups, and letters of complaint still went unanswered. A state senator threatened legislation curtailing the bureau's powers.

A spokesman for the bureau admitted no blame could be placed on the computer. Rather, the missent notices were caused by keypunch mistakes, as well as illegible writing on parking tickets and inaccurate data in the motor vehicle department files.

To avoid future errors, the files are being updated and more information is being put into the system, so a series of checks can be developed, the spokesman said. Students have been hired on a part-time basis to answer letters of complaint, and summons are being placed on microfilm for checking against complaint letters.

And, what about the computer, the main "villain" in the controversy? It does not even belong to the bureau but rather to the systems house responsible for software design. The bureau simply rents computer time, the spokesman said. The planned changes will require very minor software modifications, he added.

Now maybe the authorities in upstate Silver Creek, can forget about that $25 fine for illegally parking a snowplow in Times Square in July.

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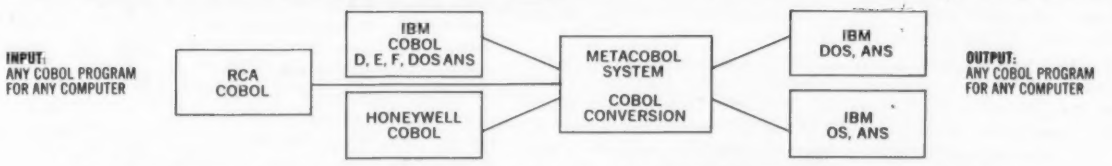

Translate COBOL programs to IBM ANS COBOL without affecting the original integrity.

The MetaCOBOL conversion procedures (a set of ADR supplied MetaCOBOL "macros" easily adapted and tailored by a user) are designed to perform without affecting the integrity of the original program. Diagnostics are produced when a need to translate becomes evident and the solution depends on a customer's mode of operation. The customer can then make the changes manually or modify the MetaCOBOL procedures to his requirements.

The five essential functions of the basic MetaCOBOL conversion procedures are:

Protection against use of a name that conflicts with an ANS COBOL reserved word. Some words used as data and procedure names within COBOL have a reserved meaning under ANS. These will be diagnosed and changed to a hyphenated format. Examples of such terms are START and TIME-OF-DAY.

Simple syntax translation of words and phrases. Simple statements which are often oriented to other COBOL levels are changed to IBM ANS equivalents. For instance, references to RCA-SPECTRA, or HONEYWELL 200 are changed to IBM-360; COPY and INCLUDE statements are changed to COPY with the quotes removed from the external name; COMPUTATIONAL fields are SYNCHRONIZED; ENTER LINKAGE and ENTER COBOL are removed; etc. Most simple syntax changes **do not** produce diagnostics.

Complex syntax translation. Complex syntax changes to IBM ANS format are performed wherever possible. Examples include conversion of the SELECT, APPLY, SAME and RERUN clauses in the ENVIRONMENT DIVISION and reformatting of DECLARATIVE USE clauses of the PROCEDURE DIVISION. If conversion is to OS as well as ANS, UNIT-RECORD files are changed to utility. RESERVE clauses are dropped, BLOCK CONTAINS 0 RECORDS clauses are inserted, and device types are purged. These can then be specified through JCL at execution time. Most complex syntax changes are accompanied by messages annotating the alterations.

Complete syntax analysis These are a number of conditions diagnosed as necessary changes without being altered by the basic conversion procedures. Often the MetaCOBOL user can decide upon a standard and modify the procedures automatically. In other cases, a manual modification of logic would result in a cleaner solution. Some examples of such situations are checks for the printer end-of-form which should be changed to line-counting logic, and numeric class tests of items not defined as signed numeric which should be redefined as such.

End-of-conversion analysis. A number of displays can be produced at the end of the conversion run: counts of critical verbs (such as ACCEPT, DISPLAY, EXHIBIT, SORT, STOP literal, IF form-overflow, IF NUMERIC and TALLY.) The attributes of all records within the FILE SECTION can be displayed in a special DMAP. Advisory JCL listings can be produced to ease the burden of preparing JCL for testing and operation. Honeywell conversion procedures list data names which require VALUE clauses in working-storage.

As with most MetaCOBOL procedures, ADR encourages customers to adapt the basic procedure sets according to their own requirements.

Other uses of MetaCOBOL in a conversion environment.

Program checkout of converted programs. The converted program can be submitted to the MetaCOBOL Test Data Generator in order to produce the test data required for checkout.

The MetaCOBOL Run-time Debugging Aid can be used to debug the converted program in the context of its new environment and to document the adequacy of testing.

The MetaCOBOL COBOL Performance Monitor can be used to point out areas of potential improvement within the operational environment.

Improved clarity. The MetaCOBOL System can improve the documentational quality of data and procedure names used throughout the program, as well as guarantee adherence to installation standards. These tasks can be performed during the same pass as the conversion, or in a separate pass.

Program enhancements. There are a number of available MetaCOBOL procedures to facilitate maintenance efforts, improve the operational environment, etc. One example is the Paragraph Numbering Procedure, which consecutively numbers procedure names within an existing COBOL program for ease of reference.

Another example is the Systems Management Procedure, which embeds operational accounting logic within an OS/ANS COBOL program by program name, file name, time, date, and counts of reads/writes. Periodically, the file created by this embedded logic can be displayed in various sequences to determine program and file activity. As a result of such analysis, the operations department can improve job mix and file allocation. (For instance, a disk master file with very little activity might be changed to a tape file, whereas a tape file with high activity might be made disk-resident.)

File conversion. A common post-program conversion problem is file conversion. Files created by lower-level COBOL programs may not be compatible with ANS COBOL. For instance, lower-level compilers are typically less rigid than ANS COBOL concerning sign conventions of data areas defined as signed numeric. If such a field is included within a group definition for comparison purposes, the compiler generates a compare logical instruction. Older versions often carry signed numerics as unsigned. ANS forces a positive sign. Therefore, unequal comparison results. With MetaCOBOL's translator an ADD +0 instruction can be generated to force a positive sign into fields described as signed numeric, guaranteeing file integrity. And saving valuable time.

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IBFI Told Paper Best for DP

HOLLYWOOD BEACH, Fla. – Paper will be around for a long time and its use will actually increase, because users do not trust credit cards, according to the president of a data input company.

Albert Bieser, president of General Computer Systems, of Dallas, made this prediction despite current experiments by the banking community, which is investigating the "cashless, checkless society."

Bieser told a session at the International Business Forms Industries (IBFI) conference that some users must have hard copy to have confidence in their computer systems.

While "most of the experts in the field" believe all data collected for business uses will be acquired by source data automation, this may take "5 to 20 years," he said.

In the meantime, "a great deal of batch processing still must go on," Bieser commented.

An OCR device may be required as part of some users' input systems, Bieser commented. While users still have their required paper, the unit itself would appear "as simply a very high-speed entry operator" to the computer hardware.

"Similarly, an on-line terminal in the field would look like a very slow-speed operator," he noted.

Bieser made his comments during an input panel session.

Other panelists did not agree with his outlook for paper. Another speaker had called paper reports the "ecological nemesis of the computer industry."

The three-day conference drew 65 paid attendees, about one-third of the figure required to break even.

Regarding the recent recession, one speaker reflected on the riddle of "when is a bad year a good year?"

1970 was a "good year" because it began "the era of justification," said Zakar V. Zakarian, president of Western Union Data Services. "It separated the men from the boys."

Zakarian said the recession has caused users to reappraise their DP usage, although "only a few" had gone so far as to ask why their computers were installed in the first place.

Traveling Lecturers Set for CW Forum

NEWTON, Mass. – Three industry figures will become "traveling lecturers" with *Computerworld's* conference which visits nine cities next year.

Lawrence Feidelman, Dr. Dixon Doll, and Charles Lecht have been named keynote speakers for the Computer Users' Forum and Exposition, which opens its tour in Boston on Feb. 22.

Feidelman, president of Management Information Corp., Cherry Hill, N.J., and editor of *Data Entry Today*, will address the opening-day audiences on data entry. Feidelman is a Drexel University instructor, and recently collaborated with George Bernstein on a 15-year study/projection on the DP industry.

Doll is a consultant and faculty member of the graduate school of business, Eastern Michigan University. A communications specialist, he is president of the Ann Arbor chapter of ACM. He will speak to the second-day audiences on data communications.

Lecht is an internationally known speaker and consultant, and is president of Advanced Computer Techniques, New York.

He will address the third-day audiences on operational efficiency. His programming books are "recommended reading" for the CDP exam given by DPMA, and he has also prepared lectures for the American Management Association.

After Boston, the "caravan" will visit, in order, New York, Washington, D.C., Atlanta, Dallas, Los Angeles, San Francisco, Chicago, and Detroit.

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Poor User Attitude Is a Cause For Poor Manufacturer Treatment

LONDON – Users have only themselves to blame for the treatment they receive from the computer manufacturers, Philip Dorn, senior consultant at Union Carbide, told a symposium here recently.

Users "have taken" what they have been given by the computer manufacturers over the past years, Dorn said at the meeting sponsored by Lowndes-Ajax Computer Service, according to reports in *The Financial Times.*

He said users should take a look at the equipment manufactured by the independent peripheral companies – a segment of the industry he said was being forced out of business by competition from the mainframe makers despite equipment cost savings available through independents.

He said it was in the interests of users to keep this sector of the industry alive, but added that users have so far been reluctant to install equipment that went beyond the norms established by IBM – no matter how brilliantly designed.

Users are only ready to accept equipment that performs exactly like IBM equipment, but at a reduced price, he said, not equipment that performs beyond the *de facto* IBM standard.

At the same meeting, Dr. Herbert H.J. Grosch, senior research fellow at the National Bureau of Standards, said that despite efforts to support local computer firms, the Europeans have already lost the battle in the computer market and he predicted that IBM would control 90% of the world computer market in a short time.

Grosch said the British, with their good reputation in software and systems work, should concentrate on those areas and devote its national resources to promoting businesses serving those areas.

The investment that is presently being proposed for computer research and development – $120 million annually – would return a much greater profit if applied to the software and systems area, Grosch said.

Mini Modified To Debug Better

(Continued from Page 1)

Either approach provides the minimum amount of information needed to solve the problem and this is deliberate, according to Enabnit, who noted that most debugging runs give the programmer so much data that he is swamped.

Although the storing of addresses adds considerable operating overhead to a program during testing, this operation would be eliminated through a normal recompilation before the program is put into operational status, Enabnit added.

The interrupt handler affects only the program being debugged. A second program operating in another partition will continue to run even if the program being tested comes to an abnormal halt, Enabnit added.

Goodyear presently has no plans to make the debugging system generally available.

News Wrapup

NCR Allowed to Raise Prices

WASHINGTON, D.C. – NCR has been allowed to raise maintenance prices under Phase II of the wage-price freeze.

The firm was given permission to raise its computer maintenance rates 1.8% by the new Price Commission set up to establish guidelines for rate increases during Phase II.

Presently, Burroughs is asking the commission to raise computer maintenance rates by 2.5%.

IBM has also filed a request for increases, but did not give a percentage rate of the proposed raises or specify what equipment would be effected. The Price Commission returned the application to IBM for further clarification.

Suit Charges Illegal Use of Voter List

LOS ANGELES – Computing and Software, Inc., has been named in a $100,000 suit charging it with using lists of state voters stored on computer tape for commercial purposes, which is a violation of state law.

The suit has been filed in the California Superior Court by the office of the Secretary of State and alleges Computing and Software invaded the privacy of more than 350,000 registered voters.

Daniel Lowenstein, an attorney for the office, pointed out the tapes are available to anyone, but only for use in political campaigns. To use them for any commercial purpose is illegal, he stated.

Computing and Software is charged with using the tapes to send out promotional mail for a development in Sonoma, Calif.

A spokesman for Computing and Software said the firm was still studying the suit and had no comment on it.

IIA Requests Software Patent Ruling

WASHINGTON, D.C. – The Information Industries Association (IIA) has filed a brief requesting that the Supreme Court rule on the patentability of computer programs.

The *Amicus Curiae* brief supports a move by the Solicitor General to get the high court to decide on patentability of software as evidenced by the Benson-Tabbot decision of the Court of Customs and Patent Appeals. IIA had previously urged the Solicitor to take the case to the high court.

In its brief, IIA stated "a definite answer to the question of patentability of computer programs is needed to provide the business community with more certainty in its transactions which involve and depend on the proprietary status of computer programs."

Federal Voter Registration Bills Killed

WASHINGTON, D.C. – The bills proposing federal maintenance of voter lists [CW, Nov. 17] were defeated recently in the Senate, and sent back to committee for consideration in the next session of Congress. The bills called for the U.S. Government to computerize lists of actual and potential voters in all the states, and send them registration notices by postcard.

Some politicos claimed this was federal interference in voter registration, which is left to the states by the Constitution.

Political observers called the defeat a victory for President Nixon, since most new voters signed up by the system would probably vote Democratic.

Punch Card Voting Installed in Washington

SEATTLE, Wash. – The King County Council unanimously passed an ordinance authorizing the use of punch card voting in future county elections.

Successful experiments with pilot programs in primary and general elections this fall led to the move.

The county expects to convert to the new system in time for the 1972 elections. Savings of $131,095 are anticipated for 1972 as the result of the change, according to Norward Brooks, director of records and elections.

Students Swamp Texas University Computer

AUSTIN, Texas – There's at least one place where the computer business is booming – at the University of Texas. So many students are using the university's computation center, that the center director Charles H. Warlick has been forced to ration computer time.

Time allocations and a charge schedule have been established for students and departments using the facilities. Students are now given a specific amount of computer time when they register for a class, and each department that uses the facilities is charged a fee.

Bank Discovers Computers Don't Bounce

MEMPHIS, Tenn. – A bouncing baby Burroughs B6700 has fouled up a bank here. The bouncing was all too literal, as movers bringing the central processor of the 6700 into the First National Bank's computer center managed to drop it off the dolly.

The movers – who neither Burroughs nor the bank wants to mention by name – were apparently unaware of the weight of a computer, and used equipment too light for the task. As a result, one corner of the CPU suddenly hit the floor, and baby had a bent frame.

The mover was under contract to Burroughs, though, so the bank's only problem was the delay of installation. The accident happened in mid-November, and within two weeks a brand new B6700 was delivered to the First National.

It did not bounce.

Sabre II to Take Off For American Airlines

By Dennis Goss
CW Correspondent

TULSA, Okla. – Final testing of American Airline's giant, second generation, reservations system has begun and is expected to be completed by April. The system will replace Sabre I, one of the first and best known such systems. Sabre II is designed to eventually handle other tasks, as well.

Clifford M. Taylor, the carrier's director of environmental software systems and one of those in charge of planning for Sabre II, explained that the actual date when operations will begin is dependent on spring flight schedule changes. "This effects our entire data base, and we would like to implement it on the old system to make the switch simpler."

The new system, which has been valued at more than $65 million, has been in test for two years. According to Taylor, final testing involves simulation of actual operating conditions. "Rheostats built into our communications processor enable us to vary the speed at which it will operate. This should give a very accurate picture under all conditions," the 16-year American employee stated.

The heart of Sabre II is two IBM 360/65s, each with 768 Kbytes of core. Taylor indicated these processors will be replaced in the future by two IBM 370/165s. "It depends on volume and demand," he explained, "but it is only a question of time." One processor serves as a backup.

To control data entering and leaving the IBM equipment and the system's vast communications network, a Collins C8561 communications processor is employed. Interfaced to IBM processors are eighteen 2314 disk storage units, three 2361 core storage units, 12 magnetic tape drives, a card reader, and a line printer.

Sabre II is slated to handle 40 million reservations a year from over 2,000 terminals, maximum of 53 messages a second initially; up to 75 a second with modifications; and as many as 120 a second with the installation of the 370/165s.

American expects the system to have an 8- to 10-year useful life.

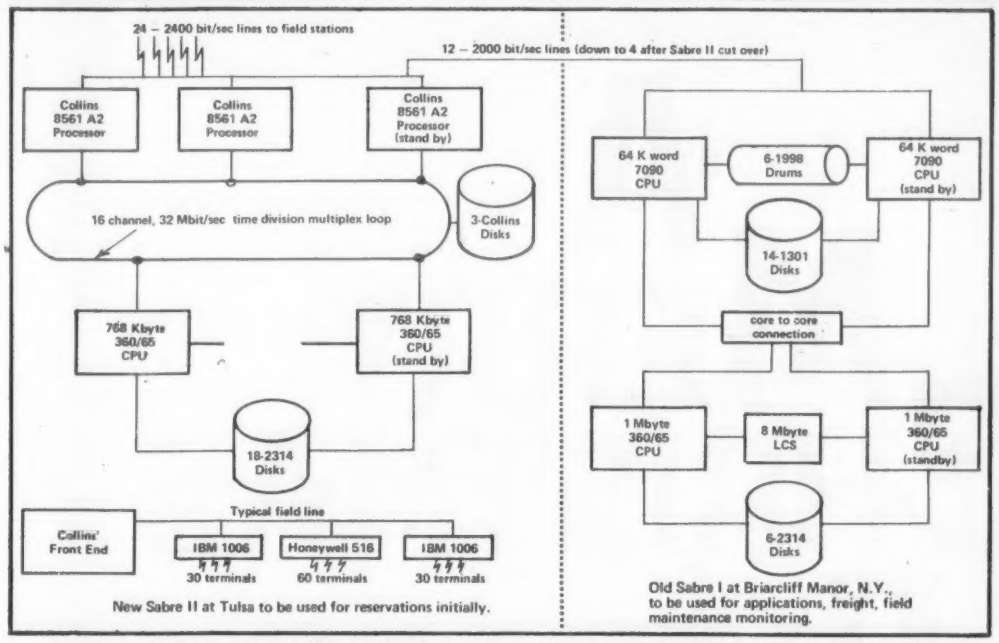
Taylor said the reason for locating Sabre II near the carrier's Tulsa maintenance base, rather than at Briarcliff, N.Y., the location of the IBM 7090-based Sabre I, was the base's great requirement for data support and a common center.

"We plan to use Sabre II for more than just reservations. In time, it should have five major functions: passenger service, freight handling, maintenance control, flight operations, and hopefully accounting. Taylor explained that accounting operations now carried out in leased quarters at Lake Success, N.Y. may be moved to Briarcliff, a company-owned facility. But, he predicted a total consolidation in this city, so all data processing employees could work close together. Data requirements at the maintenance facility required Sabre II nearby to keep communications costs to a minimum.

The Sabre I system is hard copy-based due to its age, Taylor explained. While under transition to Sabre II, specially designed visual terminals are being installed. "Most will be installed as replacements for the present terminals are required, or as company growth dictates," he said.

More than 2,000 of the terminals will be placed into service. Each 64 terminals require a Honeywell 516 minicomputer as a data concentrator.

In early January, American will begin switching communications lines from Briarcliff to Tulsa. The process will be a gradual one, and each line will be interfaced through the Collins processor. When completed in mid-February, the Tulsa facility will have 24 lines, almost twice the number currently in use. "Because we are breaking east-west lines at their approximate midpoint, the cost is about the same," Taylor explained, adding that the use of the Collins equipment halves the number of data sets required. "Sabre I requires two data sets at each terminal interchange," he stated, "because of a 'buck-passing' polling arrangement unnecessary with the Collins equipment."



American Airlines will use this configuration to get its new reservation system up and running.

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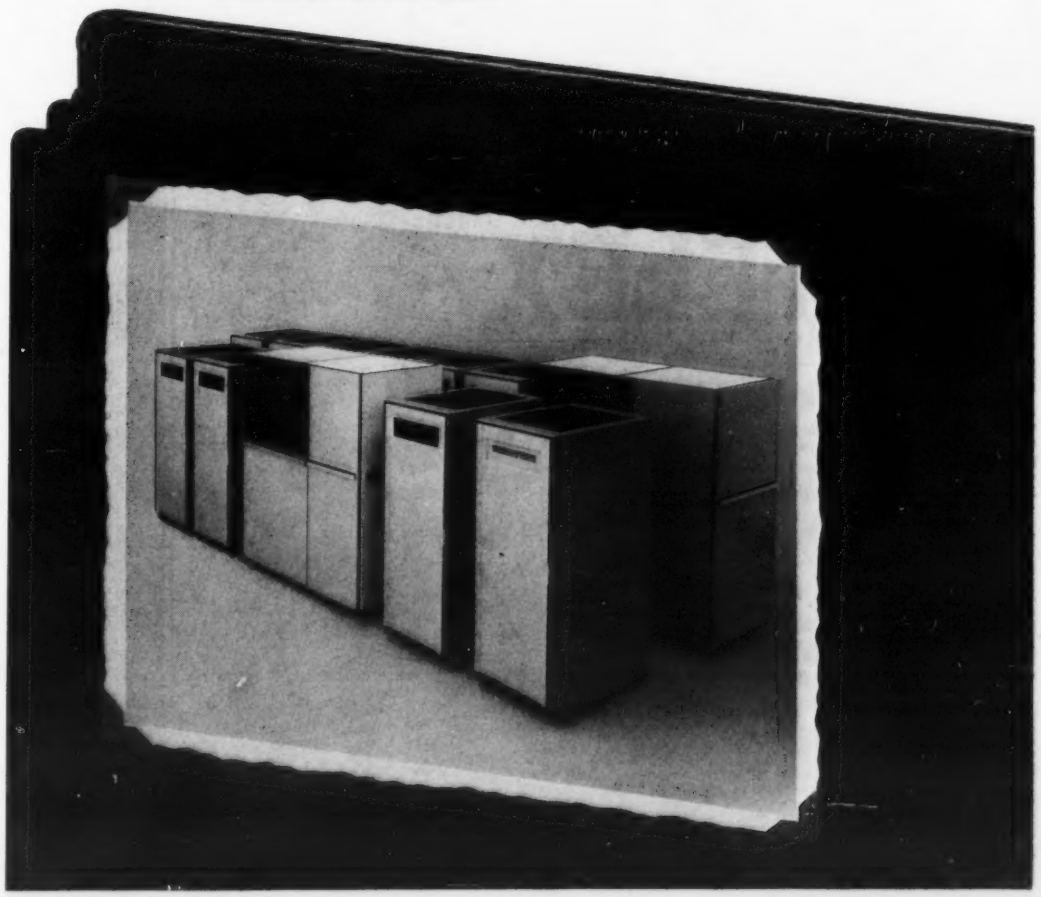

A MERRY CHRISTMAS PACKAGE...

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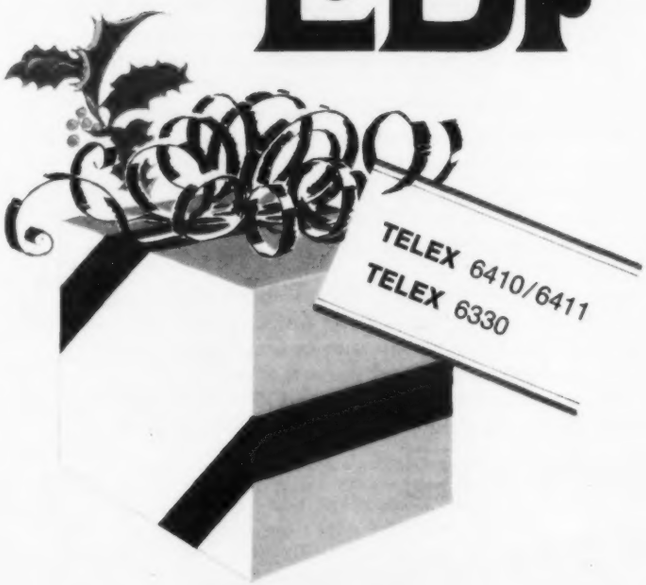

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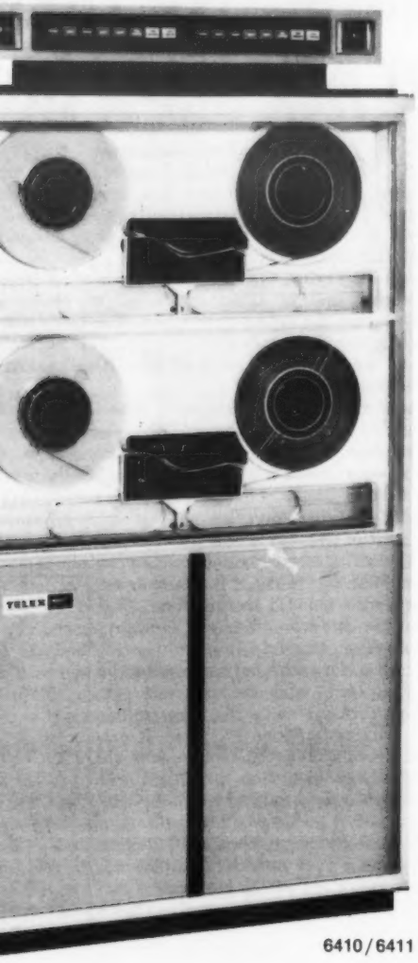

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25	32/64	20/40	7 ms	12 ms	260	160
50	48/96	40/80	6 ms	6 ms	260	260

er speed, data rate, access time and rewind EX 6410/6411 translate into faster through- atible for System 370 and 360 users, yet ntial dollar savings over comparable IBM s prices . . . and TELEX's extended term ed use policy and 30-day free evaluation reater dollar savings.

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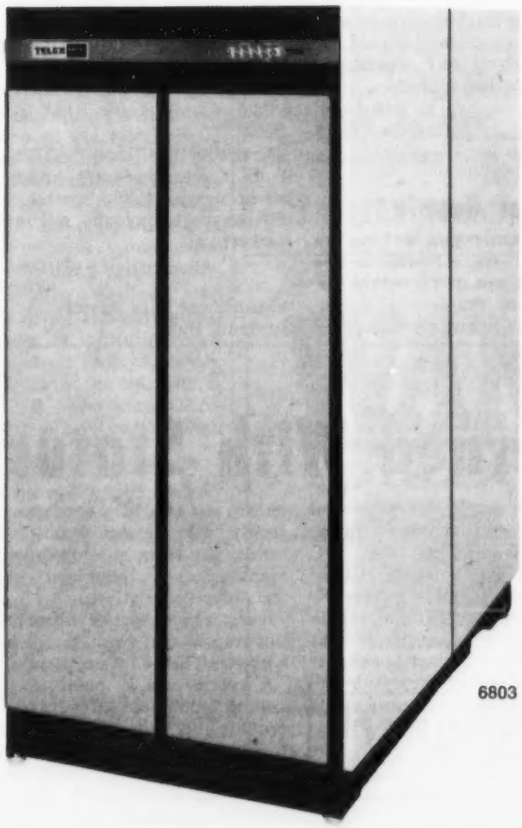

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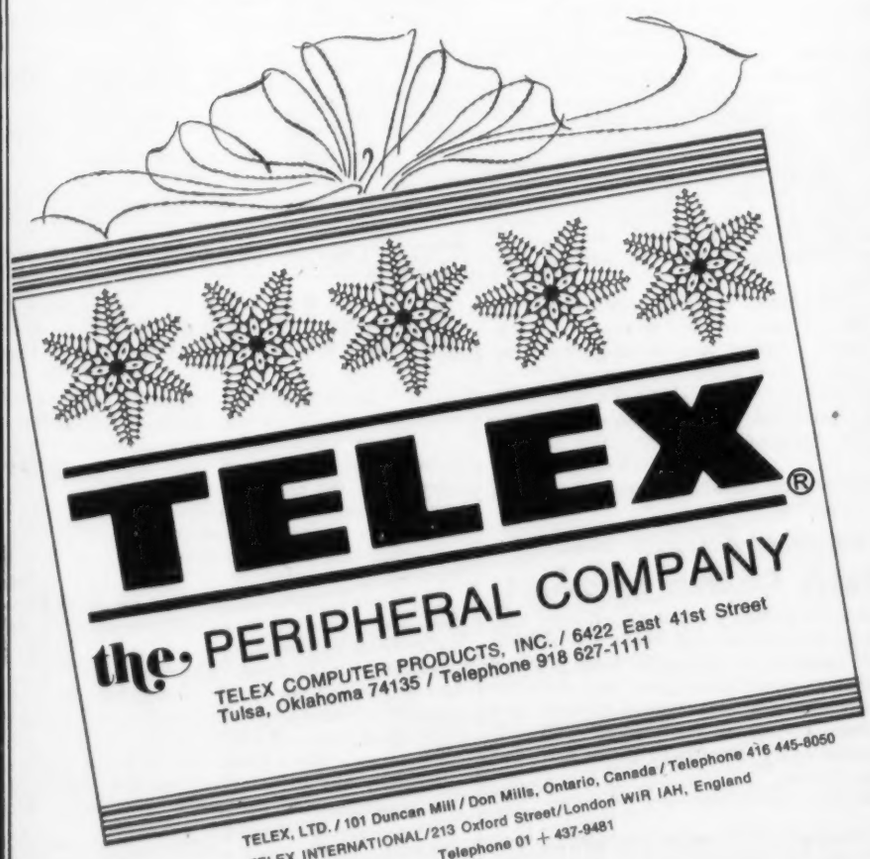

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VOL 5

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XUM

Editorial

Never Again, Please

Although a few technicalities have still to be worked out, it appears that Univac will take over responsibility for RCA's computer users.

After creating the biggest uproar the computer community has ever experienced, RCA redeemed itself somewhat by accepting Univac's offer. Although Mohawk Data Sciences might have done as well or better by the users if it had taken over the RCA division, Univac, as a major mainframe company, presented a much stronger father image. And, as things stood, the users needed reassurance as much as anything else.

It seems likely there will be other consolidations of major computer companies in the future. We hope the next one will be carried out with the finesse shown by GE and Honeywell and that we are never again treated to an RCA-type disaster.

'If You

Letters to the E

Dangerous Programs Caught By Independent Audit Unit

Some comments on the Taylor report "How Can DP Profession Control Dangerous Programs?" [CW, Nov. 10].

There are a number of alternatives not stated in the article although some might qualify under the four techniques suggested. Many large companies require that programs and systems go through a certification procedure before they are permitted to run on a production basis. This would help to screen out some dangerous systems.

Also, a few systems groups have effectively set up an audit function within them to review controls, conformity to standards, schedules, documentation, whether they meet specifications, etc.

I personally prefer to have this type of auditing as an independent activity under the internal audit function of the organization. More and more companies are setting up a preinstallation or preconversion audit activity for this purpose.

Increasingly often we find DP professionals joining the internal audit function to do more comprehensive systems audits. This would tend to pick up dangerous programs, hopefully before utilization.

A number of audit techniques are available to assist in this process. No techniques, however, can be considered foolproof. Every control has possibility of violation or evasion. All we can do is minimize risk by operating in an organized, disciplined, and controlled manner.

Harold Weiss, Director
Automation Training Center
Reston, Va.

Computer-Building Student Needs Graphics Equipment

I am a college student majoring in electrical engineering and am in the process of building a computer with graphics display capabilities. Since my financial resources are extremely limited, I am forced to rely on the help of interested people in the industry to obtain parts and equipment.

I often read of outdated or marginally defective second generation equipment that is disposed of; however, I never find out about it until after the fact. Also, in my searches, I seem to have trouble reaching the right person.

I am hoping the "right people" will see this letter and perhaps offer some assistance.

Mark James
1521 Vine St.
Belmont, Calif. 94002

Too Few Students Cited As Reason School Closed

As general manager of the Institute of Computer Management (ICM) I would like to set the record straight on the article "Taking in Abandoned Students Cause of School's Failure" [CW, Nov. 17].

International Data Center (IDC) at no time and in no way ever had 500 students full time, part time, its own or from other schools.

The school was forced to close its doors because: it had too *few* full time day students not because it had too many [as

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Computerworld welcomes comments from its readers. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

Profession Needs Defining

Aren't Users Conc

By Thomas E. O'Connor
Special to Computerworld

I recently attended a computer manufacturer/user conference and was impressed by the maturity and professionalism of such a large cross-cut group. These were not the same people I remember from that wild new environment of 10 or more years ago.

These were knowledgeable but inquisitive, with a concern in the wide range of topics being presented.

Nowhere on the agenda of seminars was one concerning the professional status of systems and data processing practitioners. Perhaps this was not a topic of immediate concern to a user's group. But why not?

Certainly the manufacturer/sponsor of the conference is concerned with the professional well being of user contacts, if only for mercenary reasons. But I'm speaking to the users: sincere in their pursuit of technical perfection, are they really naive and disinterested in attaining status?

Is acknowledgement within their own

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Editor

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Wayne R. Zanardelli
General Manager
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er Seeks Debugging Aid

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hearing about any suggestions
ders have on this subject.

D. Van Tassel
Computer Center
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Buys for Resale

Dec. 1 issue you defined an
equipment manufacturer as one
pplies equipment to others for
That may be the sensible defini-
it does not square with accepted usage.

People in the trade generally understand that the OEM is the fellow who buys equipment for resale in his own products. Thus the distinction between the end-user market and the OEM market is a parallel one. Both end user and OEM are buyers; one buys equipment for his own use, the other for resale.

Melvin E. Conway
Beverly, Mass.

Does CDP Need to Ask?

I refer to the Dec. 1 letter [from Gerard J. McKernan, CDP, of GTE Data Services asking for a definition of OEM]. What the "hell" does "CDP" stand for if a holder doesn't know what is meant by "OEM"?

What the "hell" does "GTE" stand for, if its employees don't know that the parent company and several of its subsidiaries both buy and sell in the OEM market?

James L. Bradley
Vice-President
Management Data Services, Inc.
Portland, Maine

ncerned With Status?

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Processing Management Associa-
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Viewpoint

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systems/data processing/com-puting sciences as a profession must be clearly defined and functionally established, the same as engineering, finance, manufacturing, industrial engineering, and industrial relations.

It could be indicative of our ineptness in this respect that we have not yet evolved a universal name for our field.

A subtle case in point is the rash of failures among the software houses. Their problems in part can be tied to the fact that many got their start capitalizing on the dearth of analysts and programmers at a time when many new computers were being implemented.

Few ever took these people seriously as consultants fulfilling a vital need for expertise. They were warm bodies, little more. When contractual tasks were completed, need for their existence ended in the minds of the clients.

Is this a harbinger of things to come?

T.E. O'Connor is manager, information processing systems at Raytheon Co., Semiconductor Division, Mtn. View, Calif.

Standards Take 'Monkey' Off Professional's Back

How to Get Quality Work Without Being Unpopular

The Taylor Report
By Alan Taylor, CDP

The responsibilities of a computer professional are widely misunderstood. True, it is understood he is responsible for the writing and running of computer programs as well as for the analysis that preceded it. But this is about all that is understood and it leaves a lot of ground wide open.

For instance, one approach to analysis has the systems analyst asking the appropriate department for information he needs on the problem he is trying to solve. This is a difficult task which is aggravated by any communications errors that may arise.

Indeed, the systems analyst can find himself rather unpopular by the time he has gone back several times to point out he has found still more cases he had not been told about, or which were not in the original specifications.

More Questions, More Value

Another school of thought suggests that one of the systems analyst's duties is to check the input to insure it is legitimate. For instance, if a field for the on-hand quantity of some products can go to six figures, while for other products it should not exceed two figures, is it part of the editing run to check against the product name to see that these values are not exceeded?

If a systems analyst does this, he is almost certain to make himself unpopular during the preparation of the system both because of the questions he asks, and the time involved in creating and writing those additional checks. But the resultant system may well become a more valuable tool to using departments.

Differentiating between the true user of an application and the supplier of information for systems analysis, so as to provide for the safety of the true user, is a major, but misunderstood, responsibility of a DP professional.

Operational Responsibilities

Just as the role of the systems analyst, standing at the beginning of the automation phase, gives him responsibility for work going onto a computer, an equivalent situation occurs at the output end of the computer system. And this is often even more misunderstood.

It appears to me it is impossible to say there is *no one* responsible for any piece of computer data, whether it be a grade report, or a credit card bill.

Only a computer professional can be expected to understand from the output the true facts within his systems.

If computer operations people, standing at the output end of the data, deny their responsibility for it, then they are in fact taking on the much greater responsibility of permitting irresponsible information to be made available.

It therefore clearly becomes the responsibility of the last computer professionals on the output end – the operations men – to use their specialized knowledge to insure the trustworthiness of the computer output.

More Rejecting, More Value

However, checking the validity of the output, like checking the input, can result in the unpopularity of computer people. Recently, for instance, the question of propriety of using non-reproducible ink for legends on a one-card billing system came up, when the Diners Club started printing some vital information on its bills in blue.

Before this incident I do not think anyone would have considered that the characteristics of the ink surrounding an output might be a problem suitable for a professional in the computer field.

But one group of circumstances indicates it is in fact a true professional problem. After publication of the fact that non-reproducible ink was being used [CW, Taylor Thoughts, Sept. 29] (Diners Club has since stated it is changing to reproducible blue ink) two major national consumer organizations, Consumer Reports, and Ralph Nader's Research Unit, took up the issue.

They both realized this use of such ink could cause problems to consumers on a national scale, and recommended to an appropriate Senate subcommittee that non-reproducible inks be forbidden for certain computerized billing functions! They both agreed use of such inks may not be proper.

I do not know what the particular Senate subcommittee will do. But it seems to me that the concern shown by these outside groups indicates there is a very good case to be made for computer people never using such inks.

Naturally, Diners Club cannot be expected to have been pleased by the whole affair. But then, I doubt if it would have been pleased if one of its computer managers had said, "I will not run this until you change the ink." In fact he probably would have been ignored.

But if he had been able to say instead, "Use of this particular ink contravenes standard number so-and-so issued by the appropriate professional organization," Diners Club probably would have been pleased that potential problems had been averted.

Standards take the "monkey" off the back of the professional. Although the professional has the duty of ensuring the output is usable, he need not be unpopular.

The unpopularity comes from trying to work professionally when he does not have professional standards.

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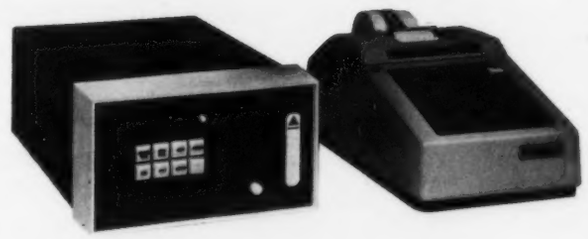

The Novar 5-11 Recording Adding Machine performs all standard functions, and records the data off-line on a Novar tape cartridge. Transmission can be made from any Novar terminal that has a tape recorder—to another terminal, or to a remote computer.

novar

Novar Corporation • 2370 Charleston Road
Mountain View, Calif. 94040 • (415) 964-3900
Offices In Principal Cities

GTE INFORMATION SYSTEMS INCORPORATED

Phase I

May 1969

Inforex introduces 8 keystation shared processor system for $120 a month* per keystation.

System 1301

- Lowest shared processor keystation cost
- First full record CRT display
- First totally integrated shared processor system

We also developed the most advanced data entry software available, including true background communications and printer support.

Shipments began in March, 1970. Today we have installed over 5000 System 1301 keystations, more than any other shared processor key-to-disc manufacturer. And shipments continue to grow.

*one year lease, including maintenance.

INFOREX

21 North Avenue, Burlington, Mass. 01803

Phase II

December 1971

Inforex introduces 16 keystation shared processor system for $101 a month* per keystation.

System 1302

- Lowest shared processor keystation cost
- Improved data management capability
- Expandable capacity

Inforex Systems 1301 and 1302 are a completely compatible family. No operator retraining. System 1301 can be expanded to 1302 performance as growth requires. Choose either System 1301 or 1302 for your best price/performance/backup mix with rentals as low as $101 a month per keystation.

	System 1301 1-8 Keystations	System 1302 1-16 Keystations
Disc Capacity (user records)	5,000 @ 125 characters	18,000 @ 125 characters
	10,000 @ 61 characters	36,000 @ 61 characters
	20,000 @ 29 characters	72,000 @ 29 characters

Contact your local Inforex representative for full specifications and delivery. Offices in twenty-one U.S. cities, Canada, Germany, France, Switzerland, Netherlands and Italy. Distribution outlets in United Kingdom, Scandinavia, Israel, South America and Australia, with more to come.

*one year lease, including maintenance.

INFOREX

21 North Avenue, Burlington, Mass. 01803

I'M CONVINCED! 'DOC' IS BEST

USER EVALUATION BY:

Mr. James Koca
Manager
Systems and Data Processing
Allis Chalmers - Parts Division
Carol Stream, Illinois

DATAMANN'S DOS TO OS CONVERSION SYSTEM PROVIDED

"an avoidance of 12,570 to 6,629 manhours" in our conversion effort

"we can accomplish the conversion (500 assembly language programs) in a range of 18 to 5 manmonths of work, and save approximately 52 manmonths"

CASE STUDY

PRODUCT USED: DOC-DOS to OS Converter

INDUSTRY: Parts Division of Allis-Chalmers which is responsible for world-wide service parts distribution on Construction Machinery, Material Handling, and Engine products.

SITUATION: The Parts Division plans to install an IBM System 370, Model 155J in December 1971 which will replace the IBM System 360, Model 40H currently installed. Concurrent with the installation of the new 'hardware,' we plan to convert from our existing Disk Operating System (DOS) 'software' environment to the full Operating System (OS-MVT).
In converting to a higher level of 'software,' one immediately is confronted with two major problems. The first is what will it cost in non-productive manhours, and the second is the time span required to make the conversion.

SOLUTION: Based on the above mentioned criteria, and the fact that our installation consisted of some 500 assembly language programs, we embarked on an evaluation study to find if any firm offered a program which would handle our situation. A study of the marketplace revealed that there are relatively few suppliers of products which would accomplish what we desired. After selecting several products and making extensive evaluations of them, we decided on a proprietary software package supplied by Horace Mann Educators which when modified as outlined in our contractual agreement will give an approximate 80% to 90% (in some cases 100%) convertability of our assembler language source programs.

RESULTS: Although the conversion is not completed, we have estimated our savings as it applied to the two criteria used to evaluate the program:
1. Non-productive manhours – based on an IBM supplied estimate of 15,712 to our estimate of 8,286 manhours, we apply what we feel to be the effective rate of convertability obtained from the Horace Mann Educators product, we can complete the conversion in 2400 manhours or an avoidance of 12,570 to 6,629 manhours.
2. Time span required – again, using the reduced manhours achieved by the Horace Mann product, we can accomplish the conversion in a range of 18 to 5 manmonths of work, and save approximately 52 manmonths.

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Random Notes

'Score' Cobol Preprocessor Available for NCR Century

NEW YORK – Score, the Cobol source-code generator and file management package from Programming Methods Inc. (PMI), has been adapted for use on an NCR Century 200, according to the developers. Previously developed versions operate on IBM, RCA, Honeywell, Univac, Burroughs and CDC hardware.

The NCR implementation requires 65K of memory and is available for $12,500 from PMI at 51 Madison Ave., 10010.

Software to Avert Data Checks Improved by Mpirs Associates

NEW YORK – By running program tests in an environment controlled by the Programmer's Aid In Debugging (Paid II) software from Mpirs Associates Inc., IBM 360 users can avoid premature failures caused by data checks. The software alters fields found to be in error, and continues the test after recording the location of the problem and the contents of the fields.

The latest version of Paid records test session results either on the printer or on magnetic tape, for user review. The test aid can be used in remote or hands-on testing and can be purchased for $350, from the firm at 507 Fifth Ave., 10017.

Vendor Offers Basic Fortran To Naked Mini, Alpha Users

NEWPORT BEACH, Calif. – A $300 Fortran compiler, which includes several extensions of Ansi Basic Fortran, is available now for Naked Mini and Alpha minicomputer users, from Computer Automation Inc., 895 W. 16th St., 92660.

In addition to handling Fortran names of any length, the compiler is said to handle arrays with unlimited numbers of dimensions and subscripts.

It also allows variables to be dimensioned within a common statement, and will accept an integer expression as a subscript.

UCC Aids Travel Agents

NEW ORLEANS, La. – Travel agencies can prepare tickets and invoices, itineraries, ten-day ATC reports and statements for commercial accounts, in addition to receiving lists of air travel accounts receivables, with the Comtrav service now available through the local office of University Computing Co.'s time-sharing network, at 234 S. Loyola, 70112.

Trips or Production

Activities Optimized by 'Route/Seq'

By Don Leavitt
Of the CW Staff

CINCINNATI, Ohio – Users may be able to improve salesmen's routes and/or manufacturing sequences by as much as 20%, in terms of cost or time, with the Route/Seq optimization package now available from Management Decisions Development Corp. (MDDC).

Modular in design, Route/Seq can be configured to place primary importance on time constraints, or on composite costs. The composite cost module takes into account both time-dependent and time-independent costs, MDDC noted.

The package can plot the optimal path of any "traveler," whether salesman, internal messenger or delivery vehicle, from base station, through a set of destinations and back to base.

The user supplies travel times or costs and data on earliest and latest acceptable visit times for each destination. The routing plan generated will satisfy all constraints while minimizing total elapsed travel time or costs, according to MDDC.

Route/Seq is applied to the sequencing of work through production or service facilities and takes into account significant changeover times or costs between jobs. Typically, these occur in the manufacture or processing of glass, paper, polymers, synthetic fibers, or detergents.

One option available with Route/Seq will cause the system to print several possible routes or sequences and leaves the final choice to the user, who may be aware of significant factors that cannot be quantified.

Written in Fortran IV, Route/Seq has been implemented in less than 25K words of core on a DEC PDP-10, and has been run in time-sharing mode on an IBM 360/65.

The package varies in cost from $9,600 to $19,200 depending on options and modules, plus $2,000 for installation support. Monthly lease plans are also available from the firm at 680 Northland Road, 45240.

Low-Cost 'Reloc' Lets Programs Run in Any DOS/360 Partition

DOWNEY, Calif. – DOS/360 users in multiprogramming environments can store program object modules in self-relocating form, for execution in any available partition, with the Reloc package from Computer Guidance Associates (CGA).

Without software such as Reloc, DOS users must store separate images in the core image library for each partition in which they want to use a program.

Since each image must have a unique name, this adds to the size of the library and complicates the organization of the job stream.

Reloc adds one step to the cataloging, and another step to the retrieval of program phases from the user library prior to execution. It does not require any modification of the DOS supervisor, company spokesmen stressed.

The system can handle single or polyphase programs in the user's choice of source languages, since it operates on the object level, according to the firm.

Reloc operates under DOS at the time a program is cataloged. If a phase card contains an address of '+0,' Reloc adds a control section to the program which, at execution time, will resolve all relocatable address constants.

Reloc costs $2,200 or about 40% less than similar packages. CGA is at 8221 Third Street, 90241.

File Study Eased With 'Selex'

CHICAGO – Test data can be created on tapes, disks or cards, selected product or mailing lists can be printed, or changes in a file can be studied over time, with the Selex file analyzer from Tech-Systems Inc.

The system works with one input file at a time, but can generate any number of output files on any medium.

Selex, a load-and-go compiler, develops object code from a series of nearly free-form control cards. Rather than providing parameters to prestructured program logic, these cards are said to give the user up to 104 variables for tailoring the program to his exact needs.

Selex supports a full range of logical operators, including either the presence or absence of the condition defined, the company said. Records can be counted, but the current release of the file analyzer does not include further computational capabilities.

With the available features, the Selex user is able to create mailing lists based on virtually any criteria he wishes, such as Standard Industrial Classification (SIC) number or size of previous sales, according to the firm.

After a mailing, users can apply the same criteria to do a statistical analysis of the selected records.

Selex operates on any DOS/360 configuration with at least 32K bytes of core. It is available on a permanent lease basis for a one-time charge of $3,000.

Tech-Systems Inc. is at 2823 N. Milwaukee Ave., 60018.

Telstat Service Evaluates Bonds

NEW YORK – Banks, brokerage houses, insurance companies and other users with large holdings in the bond market are able to keep up-to-date on the value of their investments, with the Telprice/70 Municipal and Corporate Bond Service now available from Telstat Systems Inc.

The heart of the service, according to the company, is a sophisticated mathematical model which requires a particular set of numerical values to determine the current yield of each individual bond.

Telstat provides both the basic model, written in Fortran and Cobol, and a list of the appropriate coefficients, updated as often as once a week, based on user requirements.

The modeling software requires approximately 32K bytes of core on an IBM 360.

Telstat Systems Inc. is at 150 E. 58th St.

CRTs Used to Plan Ship Reservations

MIAMI – An on-line reservation system with CRT capabilities, developed primarily for cruise ship lines, can be adapted for use by airlines or hotels, according to the developer, Mr. Brain Inc., 843 N.E. Second Ave., 33132.

Written in Cobol for Burroughs B2500 and B3500 CPUs, the system operates in 20K bytes of main memory, and maintains information on any number of ships, cabins, voyages and advance reservations.

In addition to supporting on-line inquiries and ticketing, Mr. Brain's software provides a variety of management reports and accounts receivable processing. The system can be purchased for $50,000. Lease terms are also available.

First in Quality

When we introduced EXECUPORT in 1968, we called it the only high-speed, quiet, reliable, self-contained, portable thermal page-printing transceiver in the world.

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400 MICHIGAN AVENUE, CHICAGO, ILL. 60611

'Spiral' Reads, Retrieves Texts From Tape, Disk

ALBUQUERQUE, N.M. – Researchers are able to examine and retrieve large amounts of factual data from textual material stored on tape or disk, by using the Sandia Program for Information Retrieval and Listing (Spiral) now available through Sandia Laboratories.

The Fortran program scans the stored library and indicates how much of a particular book or document is devoted to the subject in question, expressed as either a single word or a phrase.

Spiral also provides the option of printing all paragraphs of the text which contain the specified subject.

The phrasing of the stored data need not be identical to the user's choice of words for Spiral to recognize the relationship, a Sandia spokesman said. In both storage and retrieval processing, Spiral ignores such elements as punctuation, vowel endings of words, suffixes, prepositions, articles and some common verbs.

A phrase entered as "character of the human nervous system" becomes, for example, "character human nerv system." Stored phrases such as "character of the human nervous system," "characteristics of the human nervous systems," "characteristically, the human nervous system," or "characterize the human nervous system" would all be read in the same abbreviated way and thus match the inquiry phrase.

If desired, the system can be instructed to recognize scrambled versions of the phrase.

In the storage module, Spiral creates an index at the same time it compresses data to be filed. The index is designed to provide the location of every significant word in the stored library.

The index is used by the retrieval module and can work on 100 inquiries simultaneously, and find answers for each "in a few seconds," Sandia said.

Spiral is currently operational on Univac 1108 and IBM 7090 CPUs. Work is continuing to adapt it to other hardware.

For now, copies of the program are available at no cost, directly from L.E. West of the Applied Computer Science Department at Sandia Laboratories, 87115.

Bureaus Can Service Insurance Agencies

MANSFIELD, Ohio – Service bureaus are able to provide insurance agencies with monthly customer statements, aged accounts receivable reports and detailed customer account ledgers, with the accounting system available from Interstate Business Services, Inc., 51 N. Main St., 44901.

Account current reports and summaries, along with producer statements, are produced and agency performance is summarized for the current month by company, producer and class of business.

The package operates on Honeywell 200 series CPUs, with 32K core and five tapes. Written in Cobol D, it is available for $35,000 plus a percentage of gross for 10 years.

Bits & Pieces

OCR Goes Twice as Fast With Optional Transport

NORRISTOWN, Pa. – Scan-Data Corp. has doubled the paper handling speed of its Model 250 Page and Document Reader by offering an optional transport mechanism.

The new addition raises the paper handling speed from 180 3-in. document/min to 450/min, the company said.

The option increases the cost of the Model 250 from $4,200/mo to $4,560/mo. First shipments will be made during the second quarter of 1972 from 800 E. Main St. 19401.

Caelus Pack Replaces IBM 3336

SAN JOSE, Calif. – The CMCX disk pack from Caelus Memories is compatible with the IBM 3336 pack and intended for use with the IBM 3330 and equivalent disk drives which operate with the IBM 370.

The pack has a storage capacity of 100 Mbytes, a track density of 192 track/in. and a bit density of 4,040 bit/in. In addition to the 404 primary tracks, seven alternate tracks are provided.

The CMCX is priced at $850, $150 less than the IBM 3336. Deliveries will begin in January, 1972 from 967 Mabury Rd., 95133.

Prefab Vaults Guard Mag Tapes

BALLY, Pa. – The Prefab Walk-in Storage Vaults for computer magnetic tapes and disks, from Bally Case and Cooler, Inc., are designed to protect their contents from flame, heat, water, steam, high humidity, dirt, dust, fumes, demagnetization, sabotage and pilferage.

Prices for the vaults start at $1,289 for one that is 6- by 6- by 7-1/2 ft. high. Delivery is about two weeks.

16mm Card Inserter Costs $1,050

BLUE BELL, Pa. – A 16mm microfilm desktop aperture card inserter/verifier, designed for film viewing prior to selecting and cutting images or strips to be inserted into aperture cards, has been introduced by Remington Rand. The F-1601-B permits insertion at an average speed of 450 card/hr. It has a standard 20X magnification with 16X and 24X lenses optional. Price of the unit is $1,050. Remington Rand is at P.O. Box 999, 19422.

Documentation Has Mark Sense

MELBOURNE, Fla. – A mark sense option has been made available for all its card readers by Documation, Inc., giving five of its units the ability to read all 80-column cards, whether the data is punched, pencil marked, or both. The units will read the data at full operating speeds with guaranteed data transmission. Cost of the feature ranges up from $8,500.

Documation is at 841 E. New Haven Ave., 32901.

Kits Help Plan for 370 Systems

INDIANOLA, Pa. – Computer room planning kits that include 1/4 in. scale models and 1/4 in. thick grid board are available for IBM 370/135 and 370/155 systems.

Kits for Burroughs, CDC, Honeywell, Univac and NCR equipment are also available, as well as for 360 systems.

A 28 item kit for the 370/135 is priced at $49. The 46 piece 370/155 kit costs $79 from Visual Industrial Products, Inc. 15051.

Low-Cost Graphics Terminals Combine Vectors With TV Image

By Frank Piasta
Of the CW Staff

CAMBRIDGE, Mass. – A line of Computek graphics terminals, that features low cost and the ability to combine display of vector graphics, alphanumeric data and TV images, can be used with the IBM 360, most minis, as well as an RS232C interface.

The Computek 300 terminals are priced at $3,900 and include a TV-compatible CRT, keyboard, vector generator, character generator, controls, and a serial interface.

Parallel interfaces are optionally available off-the-shelf to tie the terminal to such minis as the DEC PDP series; Varian 620; SEL 810; Honeywell 316, 416 and 516; Data General Novas; XDS Sigmas; Hewlett-Packard 2114, 2115 and 2116; and the CDC 1700.

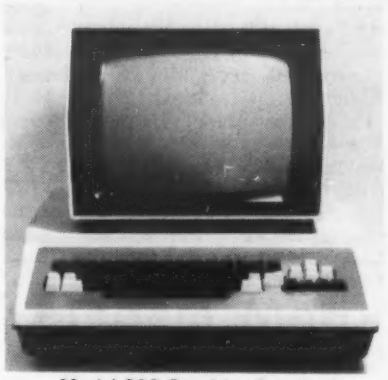
Also available are interfaces for the IBM 1130, DEC System 10, and CDC 3100 and 6000. As many as 90 terminals can be attached to a 360 channel through the company's 360 TCU which provides data concentration and message switching ability.

The Series 300 terminals can display an unlimited number of vectors and over 1,000 characters which can be individually edited on a 256 by 256 grid. The terminals can receive TV signals from such sources as TV cameras or video cassettes which can be combined with data from computers, communications channels or such input devices as graphic tablets, light pens or keyboards. The combined image can then be directed to other terminals or to TV monitors over ordinary TV channels.

The 300 series feature a 12-in. format with 525 lines. An unlimited number of vectors of any length can be displayed or 25 lines of 42, 5 by 7 dot matrix characters can be shown.

Modes available include four-byte absolute graphics, one-byte incremental graphics, alphanumeric and control. Cursor position can be relayed to the computer with a push button, without a light pen or tablet. The graphics modes use a crosshair cursor, while the alphanumeric mode uses a rectangle bounding inverted-color image as a cursor.

The graphics tablet will be priced at about $1,600, while the hard copy output will cost about $2,500. The optional parallel 8-bit computer interfaces will range from $500 to $1,000. First deliveries of the 300 terminals are scheduled for March 1972 from 143 Albany St., 02139.



Model 300 Graphics Terminal

Power Peaks, Dips, Brownouts Smoothed by Battery System

FAIRFIELD, N.J. – A standby source of emergency electrical power for computer rooms and other sensitive areas is being offered by the Airoyal Manufacturing Company in its Airoyal Continuous Energy (ACE) systems.

The increased incidence of load variations (spikes and dips) as well as brownouts and blackouts, combined with the increased sensitivity of computer systems, due to the use of volatile memories and such devices as disks and drums, are increasing the importance of an emergency source of electrical power, the company said.

The ACE systems can smooth out peaks, dips and spikes in the electrical power supplied by the utility. In case of complete power failure, the ACE can supply power for periods up to 15 min. The equipment using the power would be unaware of any power line problems, Airoyal said.

The system uses silicon controlled rectifiers and diodes to convert the utility AC power to DC power. The DC power is then transferred to storage batteries from which normal operating requirements are drawn, and which are the primary source of emergency power.

For power failures of longer than 15 min, an emergency diesel-powered generator and automatic transfer switch can be added. The diesel can be up to running speed in 10 sec, or less, after being activated, the company said.

The ACE package is available in sizes ranging from one to 500 kVA with prices ranging from about $2,000 to $250,000. The diesel generator is extra, with a 400 kVA unit adding about $40,000 to the system cost. The delivery schedule of the ACE systems varies with the size of the unit and ranges from 60 days to six months from 19 Gloria Lane, 07006.

Key/Cassette Unit Has ½-lb Keyboard

NEW YORK – The Model 044 handheld keyboard to cassette recorder from SDA Systems, Inc. features a programmed keyboard-display unit that weighs about a half pound.

The keyboard unit can be programmed to guide the operator through up to 12 data entry steps by means of lighted panels.

The recorder, along with the buffer, rechargeable NiCad battery and electronics is in a five pound case "about the size of a camera."

The cost of the Model 044 is $1,500 each in lots of 50. Delivery is currently 45 days from 1540 Broadway, 10036.

Time/Attendance Terminal Added to Turnkey System

BURLINGTON, Mass. – A time and attendance terminal with integral digital clock and contact closure circuit, from Computer Products Group at Sierra Research Corp., is meant for use with the company's turnkey source data collection systems.

The SDA-710 terminal displays the time in hours and minutes or hours and hundredths. The contact closure circuit can control such devices as a secured door.

In addition to interactive and time-logging terminals, the system includes CRT terminals, central controller, card or tape output and computer interfaces.

The SDA 710 is priced at $2,500. Delivery is 90 days from 217 Middlesex Turnpike, 01803.

Disk Pack Testing Device Detects Warped Surfaces

INDIANAPOLIS, Ind. – Warped disk packs, said to be a major cause of head crashes, can be detected with the Packometer 16 from the Discheck Corp.

The device is designed to determine total runout to ±.0005 in. of each disk surface and the spacing between disks. It can also be used to rotate the pack for cleaning and visual inspection, the company said.

Usable with 1316 and 2316 packs, the Packometer 16 uses a comb gauge for the inspection of both 6- and 11-high packs.

The Packometer 16 is priced at $750 and is available on 60-day delivery through P.O. Box 27152, 46227.

COM
Get fat and happy

If you'd rather run tapes and films to service bureaus and film labs than relax, the Quantor 100 microfilm recorder is not for you. It converts reels of tape to rolls of 16mm microfilm while you have coffee and Danish.

Quantor

19000 Homestead Road, Cupertino, California 95014 (408) 255-1000; Oak Brook (Chicago) (312) 654-3720; New York, N.Y. (212) 279-3280; Washington, D.C. (703) 524-1941

Honeywell 105 Handles Banking Tasks

WALTHAM, Mass. – Designed for use by small banks that process between 6,000 and 15,000 items daily, systems in the Honeywell 100 series of computers provide low-cost check-sorting and accounting capabilities.

Called the Model 105, the systems are available as free-standing batch processing systems or as Micr data collection systems. The Honeywell 232-5 Micr reader-sorter that reads and sorts up to 550 6-in. document/min is used in both versions.

The Micr data collection system includes a CPU with 16K characters of memory, 9.2 million character disk, 400 card/min reader, 300 line/min printer, Micr sorter, and a voice-grade communications control. The Micr system leases for $2,975/mo or sells for $126,110.

The batch processing system includes a CPU with 24K characters of core, 27.6 million character disk system, card reader, printer and Micr sorter.

One-year lease price on the batch system is $4,017. It sells for $170,525.

Included in the system prices are applications programs designed for banking applications. These include Micr entry, demand deposit accounting, savings accounting, installment loan accounting, and proof and transit packages.

Report Simplifies Choices

MOORESTOWN, N.J. – DP managers confused by the plethora of compatible memories available for their 360s might be grateful for a management-oriented report called *All About Plug-Compatible Main Memories,* from Datapro Research Corp.

The 33-page report, reprinted from recent supplements of the publisher's Datapro 70 looseleaf service, analyzes the pros and cons of buying units from a source other than IBM.

Characteristics, costs, features and drawbacks of memories from Ampex, Data Recall, Fabri-Tek, Potter, Cambridge Memories, Computer Hardware Consultants, Computer Investor's Group, Electronic Memories and Magnetics, Information Control Corp., Lockheed and Standard Memories are discussed.

Selection procedures designed to aid the user in finding suitable memory units are also suggested. The report is available at a price of $25 from One Corporate Center, 08057.

What happens when disaster and you have leased your compu Computer Leasing Company?

Richardson-Merrell, Inc. knows.

At 1:30 A.M., Sunday, September 12, a flash flood struck the computing center of one of its divisions—Merrell National Laboratories, Reading, Ohio.

Joe Walkes

It wiped out the entire installation, reducing a million dollar 360-40 computer to a mud soaked ruin. The bulk of the system — CPU, disc drives, card reader, printer and controller — was leased from Computer Leasing Company. A tape subsystem was rented from IBM.

The loss threatened to stop the handling of orders and cripple other operations. Merrell needed to restore its facility in a hurry.

What could CLC do?

At 5:30 that same morning, Lowell Thomas, Merrell's Manager of Data Processing, called his CLC account manager, V.P. Joe Walkes, at his home near Philadelphia and told him the situation.

John Stone

Here's what happened.

Sunday 7:30 A.M. Walkes informed CLC staff personnel in Arlington, Va. He then flew to Ohio for a firsthand appraisal and to act as liaison.

Sunday 10:45 A.M. Computer Leasing's management was at work. John Stone, Contracts Administrator, provided a detailed description of the system. Ward Shields, Equipment Manager, compiled a list of equipment which could be drawn on in exploring alternate solutions.

Phinney, Shields and Stone

Sunday 4:30 P.M. Art Phinney, Senior V.P., made the decision on the specific equipment to be allocated. This consisted of a CPU in transit to another customer (with his consent); peripherals in the hands of CLC's service specialists — Computer Hardware Consultants and Services, for refurbishing and reinstallation; and one peripheral from another leasing company.

Lee Meadows

Monday 9:20 A.M. Under the coordination of Ward Shields, CHCS began testing the equipment prior to shipping. Working through the night, they also installed certain special features that Merrell required.

Monday 11:30 A.M. Joe Walkes informed Merrell that a replacement system was being readied for shipment. At this point, Merrell had another problem—approval of the site by the insurance company. Another location might be necessary.

Computer Leasing Comp

UCC computer leasing company a subsidiary of UNIVERSITY COMPUTING COMPANY

2001 Jefferson Davis Highway, Arlington, Va. 22202

Will Replace Modems

Digital Links Require New Interfaces

By Ronald A. Frank
Of the CW Staff

LOS ANGELES – Data users waiting for all-digital transmission links to eliminate their modems will have to contend with a different type of interface device.

While the familiar digital-to-analog signal conversion of the modem will no longer be needed, a new type of "translator" will be required on digital lines.

Users have thus far paid little attention to this new type of "black box" because all-digital facilities are still some years away, and users are hoping that the carrier supplying all-digital service will also provide the capability to do any required signal translating.

Communications

One immediate need for a digital interface device is the existence of local loops. These physical wires running from data users' premises to a carrier's digital facilities will still have to carry data. And the point at which a signal is transferred from wires to microwave (using one all-digital example) will require a signal translation. Another such point will be where the data signal enters the local loop.

Most observers agree that this translation function is less complicated than the familiar modem. But the important point is that the digital interface will add to the cost of transmitting on the new links.

One digital interface device already available is the Intertran Unit from Computer Transmission Corp. Designed specifically to operate over twisted pair four wire facilities, the Intertran unit comes in two models, one of which can be used at varying data rates up to 250 kbit/sec. The unit costs about $1,900 from CTC at 1508 Cotner Ave.

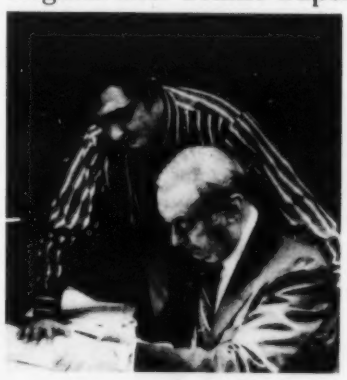
The Bell System is very much aware of the impending need for a new digital interface device. Bell Labs is currently known to be developing a "black box" to accept digital signals for use on such AT&T services as the new Data Under Voice (DUV) capability, scheduled to be offered to Bell subscribers in 1974.

The experimental device is called a Channel Terminating Unit (CTU). It is being designed to replace modems at users' installations, but it is still strictly experimental and AT&T has no current plans to tariff the unit, an AT&T spokesman told CW.

r strikes
puter from

Monday 4:00 P.M. CLC Executive V.P., Lee Meadows, arranged with CLC's parent company to have both a communications terminal and its computing facilities in Chicago put on standby for Merrell, as an interim computing source, in case there was a significant delay in preparing a site.

Tuesday 4:50 P.M. The insurance company approved the original site. Traffic Supervisor, Hal Lafler, started CLC trucks rolling.



Lafler and Shields

Thursday 4:15 P.M. The CLC equipment began to arrive.

Friday 3:30 P.M. Merrell completed the clean-up and power was restored.

Using its service specialists, CLC began installation. The equipment was put in place, connected and diagnostics begun using a CLC tape subsystem, brought in expressly for system checkout. (IBM had not yet delivered its replacement tape subsystem.)

Saturday 2:30 P.M. The checkout was completed and the system turned over to Merrell in perfect working order.

Merrell was back in operation.

* * *

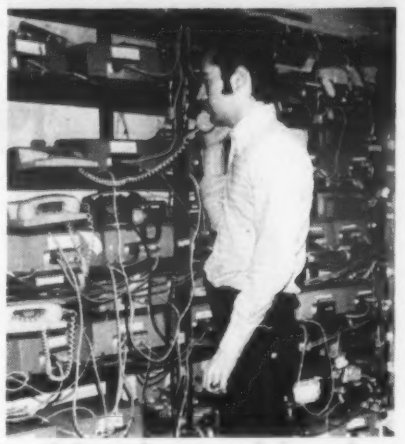
Disasters do not happen often. But the threat is there, and the question arises:

What can Computer Leasing Company do besides provide a better price?

In this case, we assembled, installed, debugged and put in operation an entire computing system before IBM completed delivery of a tape subsystem.

That gives you some idea.

pany



Modem Mad

Some of New York's off-track betting problems may be traced to its modem installation. Bill Richards of CSC has a hard time locating the ringing phone when a trouble call comes in. N.Y. Bell arranged the data sets.

(CW Photos by R. Frank)

Airline Data Sent To Worldwide Sites Via Sita Center

BOHEMIA, N.Y. – If you need an airline reservation next Tuesday between Paris and Frankfurt, chances are the request will be processed by a special message-handling center in this small Long Island town.

Operated by the Societe Internationale de Telecommunications Aeronautiques (Sita), the center utilizes a Univac 418 III system to route up to 250,000 airline messages a day.

Sita is a non-profit organization owned by member airlines who use the worldwide communications network for internal messages. Data handled by the Sita center is divided into five priority levels. Top or first priority is given to seat reservation data which comprises about 70% of the traffic. Lower priorities are assigned to administrative messages and such things as requests to locate a passenger's lost baggage.

The Sita center receives data at 2,400 bit/sec or at slower TTY speeds from any of 80 countries tied into the airline data network. After being buffered by a Univac Communications Terminal Module Controller (CTMC), messages are stored on a high-speed drum.

When the routing has been determined, and any address or other necessary data has been added, the data is transferred to an output area of the drum and fed back through the CTMC to the teletypewriter.

The Sita center uses both leased and dial-up lines in addition to 30 operating satellite channels to keep the airline data flowing around the world.

Despite the complexity of the network with its many interconnected transmission points, the Sita center with the help of the 418 CPU can handle a reservation request to virtually any location in an average response time of only four seconds. The turnaround time is based on a "typical 60 char. reservation inquiry," Sita said.

Bill Baker handles TTY message at Sita center.

Data Briefs

Inforex Has Data Mode

BURLINGTON, Mass. – Inforex has added a communications capability to its key entry system that will allow two or more terminals to be linked in a data mode.

Transmissions up to 4,800 bit/sec can be transmitted from the tape of one Inforex control unit to the tape of another with the communications feature. Records within a single or multiple file varying from 16- to 800 char. in length can be handled as "transparent" text, Inforex said.

Using Bell 201 modems, records can be transferred at a rate of 250 char./sec. Transmission is serial, synchronous mode, in 8-bit bytes half duplex.

The communications feature can be added to Inforex systems for $80/mo, Inforex said. The firm is at 21 North Ave., 01803.

Ultronic Adds Features To Two 'Data Pumps'

MOORESTOWN, N.J. – Ultronic Systems Corp. has expanded the capabilities of its 202/1200 and 201/2400 "data pump" modems. The new features include dial-up line operating capability and expanded diagnostics.

The 201/2400 allows users to operate on either private or dial-up lines with unconditioned point-to-point or multi-point networks, Ultronic said. The unit is compatible with the Bell 201B modem and is priced at about $1,500 or $70/mo.

The 202/1200 contains a switch-selectable feature that allows the operator to select either 4-wire dedicated line or dial-up facility. The unit is compatible with the Bell 202C and D Data Set. The modem is priced at about $470 or $40/mo.

Both units are available for 30 day deliveries from the Mount Laurel Industrial Park, 08057.

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Proposed British Code of DP Practice May Aid Users

By Joseph Hanlon
Special to Computerworld

LONDON – A Code of Good Practice for Computing has been proposed by the British Computer Society (BCS). Despite some serious weaknesses, the code could become a significant aid for the user in improving the quality of both computer operations and system development. It may also give users a new weapon against vendors.

But the code will be of less use to vendors in preventing the kinds of errors and abuses that draw the strongest public criticism, because it does not suggest that the computer professional has any responsibility to the general public.

The code consists of 42 easy-to-use checklists in six areas: organization, proposals and contracts, project control, system development, operation, and system review. Appendixes discuss documentation, report writing and training.

Not a day-to-day guide, the code is for periodic evaluations to allow the computer professional and DP manager to determine if procedures being followed constitute good practice.

Executives without computer expertise can also use the checklists to evaluate staff practice.

Societies/ User Groups

Several of the checklists are designed to aid management in the purchase of both hardware and software.

If the code is widely accepted, it could become valuable to the user in another way. If the user purchased a system which later failed, he would be much more likely to win a settlement if he could show that the vendor had failed to follow standard industry practice, as defined by the code.

"We hope that these checklists will allow the customer to fight the manufacturer on his own ground," summarized David Coan, a member of the committee that drew up the code.

Weaknesses in Code

The code has some serious drawbacks, however. The BCS has no way to enforce it, and is unwilling to offer any concrete support to members who claim they are being asked to work in violation of the code.

Code committee chairman Richard R. Waller conceded that the code is only "an educational exercise."

Further, the code has a large loophole: any requirement can be rejected as "uneconomic."

Finally, the code only deals with vendor-customer and employer-employee relationships; it ignores the world outside the computer center.

There is no suggestion that computer output or procedures should satisfy consumer protection laws, and standard accounting practices, or that good practice has anything to do with the person who gets computer-printed bills or who has decisions made about him by the computer.

The Code of Good Practice is a list of things that a computer professional should do. Last February, the BCS published a list of don'ts – the Code of Good Conduct.

The conduct code has slightly more teeth than the new code, as there is a committee that can hear complaints of violations.

If found guilty of violating the code, a BCS member could have his membership revoked and his name published.

Basically, the conduct code defines the computer professional's role as a consultant or employee. It deals with such issues as conflict of interest, improper claims of competence, fee splitting, and keeping company secrets. The code stresses "that the professional man should be single minded in the service of his employer or client."

As in the Code of Good Practice, the Code of Good Conduct takes little notice of the outside world. It does concede that BCS members "should have regard to the effect of computer based systems . . . on the basic human rights of individuals."

But the code notes that in actual practice, it is acceptable for a BCS member to work on a system which will "adversely affect" an individual, so long as someone else takes responsibility.

The secrecy provisions effectively prohibit a BCS member from Nader-style whistle blowing, Ashill said.

The Code of Good Practice has not been officially adopted yet. A conference is scheduled for March 6 to discuss the code, and a revised version will be adopted and published next summer.

Copies of both codes are available from the BCS at 29 Portland Place.

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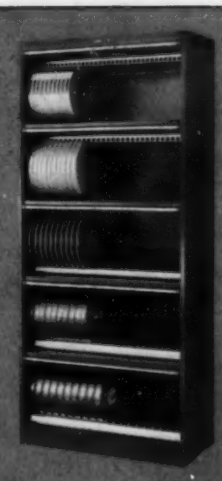

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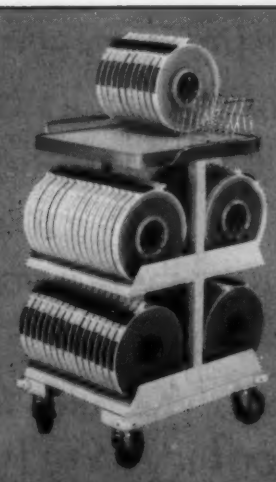

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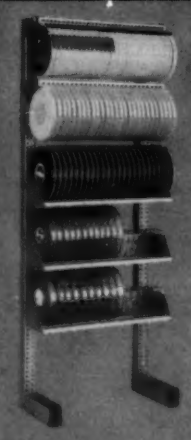

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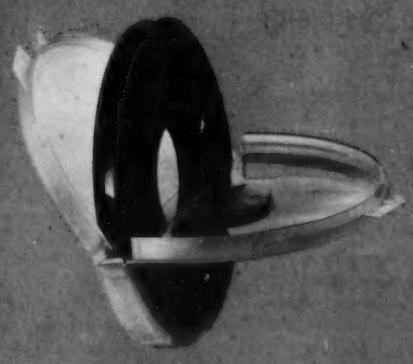

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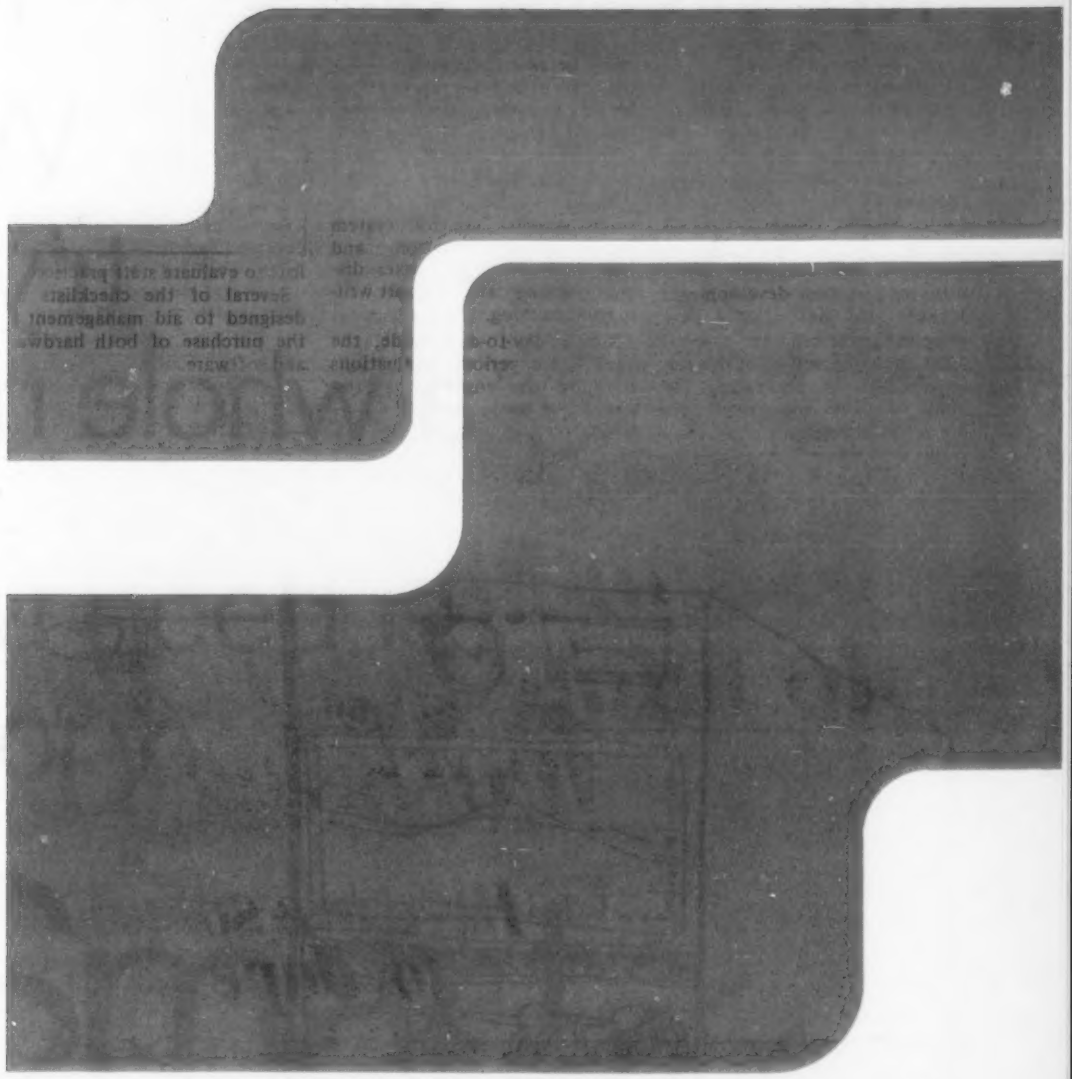

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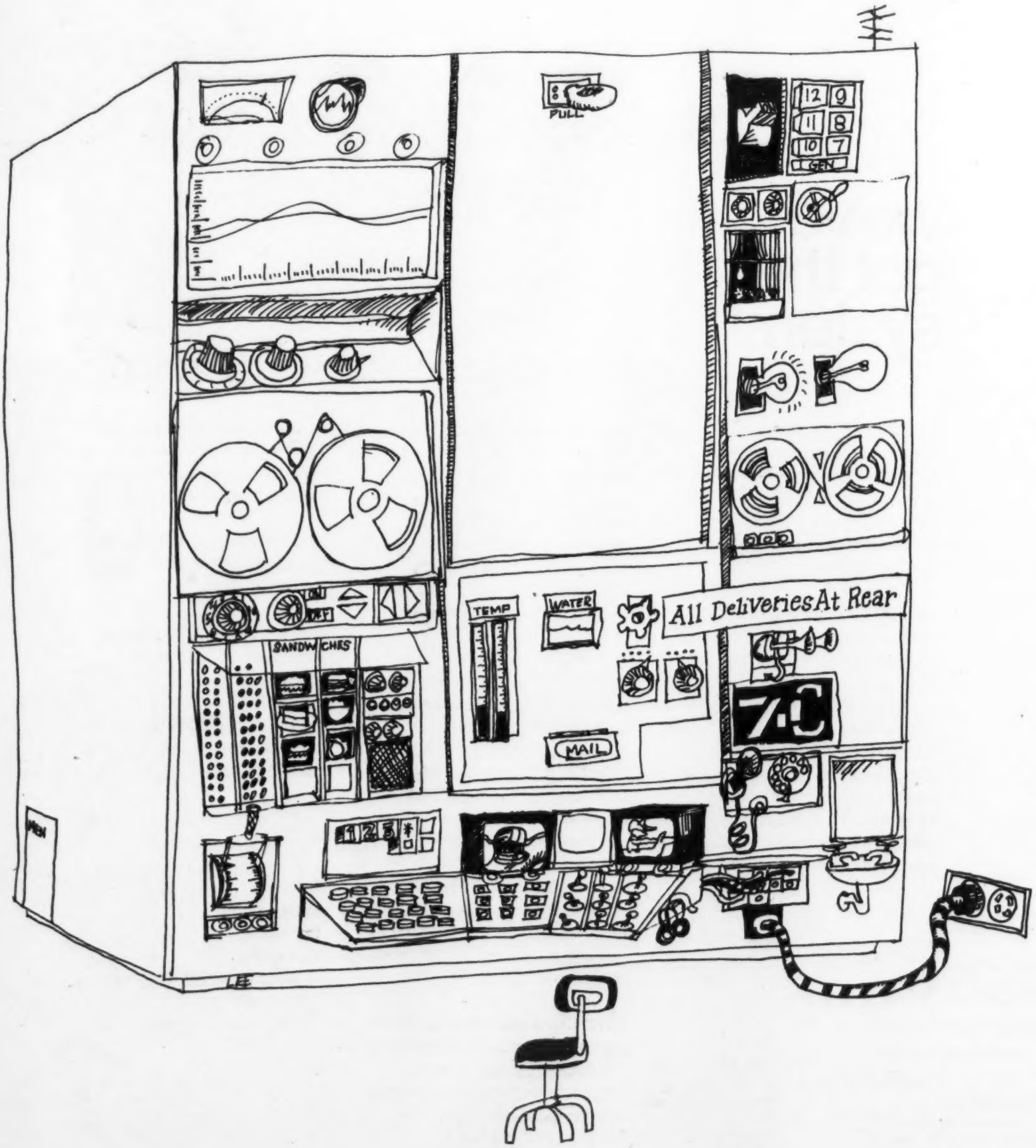

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Data on Neptune's Irregular Orbit May Lead to 10th Planet Discovery

BALTIMORE, Md. – Calculations by two local scientists assisted by a minicomputer as well as research at the observatories in Palomar, Calif., and Cambridge, England, may lead to the discovery of a 10th planet. However, Dennis Rawlins of the College of Notre Dame of Maryland is quick to add they may not.

Rawlins and Dr. James Rozics of Loyola College, also of this city, are working on the theory that irregularities in the orbit of the planet Neptune might be due to gravitational pull of a more distant unknown planet.

Least Squares Technique

The researchers have chosen the technique of least squares to determine if the presence of a new planet can be revealed by calculations of orbital irregularities. The least squares technique, a method of fitting a curve to a set of points, was chosen because of unknowns in the orbit calculations – 9 in all.

The calculations would be almost impossible to make if it were not for the computer, a Digital Equipment Corp. PDP-11, Rawlins said, adding that calculations leading to the discovery of Neptune in 1846 took five years, although scientists were not working on them steadily.

The programming was done by the researchers using standard techniques and assuming all possible types of orbits.

The project's success depends on the resolution of a number of unknowns, to determine whether irregularities in Neptune's orbit are actually caused by another planet or if they are in fact irregularities.

165 Year Orbit

Neptune is so far away from the sun (almost 3 billion miles) that it takes almost 165 years to complete a full orbit. Since it was discovered in 1846, astronomers have not been able to chart one complete trip, so some guesswork is involved in charting Neptune's orbit.

If the 10th planet exists, Rawlins believes it should be at least half the size of the earth but no more than three times as large. It would be spotted by the large telescopes at Cambridge and Palomar.

DP Aids Sightseers

CW European Bureau

LONDON – Tourists arriving in England will be able to use a new computerized ticket booking service. Frames sight-seeing tours to places such as Stratford-on Avon, Canterbury, Coventry, Oxford and Cambridge can all be booked directly at any of the 40 branches of the Keith-Prowse-Ticketon agency.

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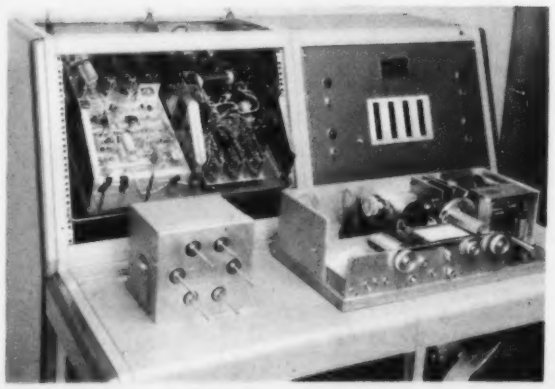

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- ☐ Marketing Trends/ Forecasts

3 User-Markets
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December 15, 1971

CI Notes

Services Reach $1.5 Billion

NEWTON, Mass. – "Profitability in the computer services business depends on being good at a particular business," not simply on computer expertise, according to International Data Corp. here.

In a report on the $1.5 billion services industry, the firm said the business, "is not one business or nine businesses, rather more like 100 businesses."

The market is presently shared by 1,500 firms. In 1970 revenues from batch services were just over $1 billion, while sales for remote batch services were $125 million, and remote-access-immediate-response revenues were $305 million, the firm said.

Com-Share Gets Injunction

DETROIT, Mich. – A Federal District Court here has granted a preliminary injunction sought by Com-Share Inc. against Computer Complex Inc. prohibiting CCI from dissemination of any of the systems software developments made by Com-Share.

Computer Complex was formerly associated with Com-Share, but has since been acquired by Tymshare Inc.

RCA Drops Magnetic Products

NEW YORK – RCA is phasing out its magnetic products business, which includes computer tapes and disk packs as well as audio and video recording tapes.

The company said this action is being taken as part of RCA's withdrawal from the general purpose computer field. About 500 employees are involved.

Supershorts

The General Services Administration has awarded a contract to United Computing Systems to place its operating system software, MAX (Multiple Access Executive), on the Federal Supply Service List.

– – –

First Data Corp. has signed a software licensing agreement with Applied Data Research, Inc. First Data will offer, through its time-sharing net, the ADR Mimic software packages.

– – –

Information Terminals has appointed Lykes Electronics Corp. as a distributor for its data cassettes.

Bennett Addresses IBFI

Survival in Computers Called Unlikely

By Edward J. Bride
Of the CW Staff

HOLLYWOOD BEACH, Fla. – Survival in the EDP industry by any but the largest firms is not probable, according to a man who left the industry when his company was going under.

Dr. Edward Bennett, founder of Viatron Computer Systems and the man behind that company's successful search for $40 million in speculative capital, now feels investment is not a "sustaining force" for new computer companies.

He said the most "healthy" source of income is from "primary product" profits, and only IBM, "and to an extent Digital Equipment Corp. (DEC)" have been able to take computer profits and apply them to the development and manufacture of new, profitable products.

Second String Competition

Addressing the fourth annual forum of the International Business Forms Industries last week, Bennett said there will always be "second string" competition for IBM. He listed DEC, Mohawk Data Sciences, and Recognition Equipment Inc., as competitors in this arena.

"But head-on survival" is less probable, he added.

Bennett predicted Control Data Corp., Honeywell, and Univac would all exit from the computer business.

The computer industry has been "sponsored" by spinoff technology wrought by government research and development funds, he said.

This source cannot endure, and speculative income is only viable as a short term force, he stated. Since stockholders will not "stand still and watch the siphoning of money" from other profitable divisions to support an unprofitable computer division, primary product profits are the only answer, he said.

Bennett cautioned his audience not to expect the U.S. Government to break up IBM, "the king of the gladiators" in the EDP arena.

Sophisticated economic societies do not break up large corporations, he said. Using Japan as an example, Bennett said there is heavy government control of the economy in that country, but the controls are used to encourage bigness, and the large companies support the smaller suppliers.

Since there are also international advantages from IBM's world trade, the U.S. Government is not likely to disturb this situation, he observed.

Three Levels

There are three levels of "maturity" in the computer industry, according to Bennett. The first involves a unique ability to service a product, and this level exists where there is a novel product, he observed.

The second level is when the product's performance becomes a strong competitive force. Bennett said this was the level where CDC entered the business.

The third level involves price competition, after service and performance have been ascertained. "This is the time the Japanese enter the industry," he said, using TV and automobiles as specific examples.

Industry giants entering the industry early gain in scale, and can apply their size to "buying power" when they become cost effective. Then, they can spend money on research and development to become more competitive in the performance stage, he continued.

Key-to-Cassette Devices Seen Sparking Data Entry Market

HOLLYWOOD BEACH, Fla. – Growth of the data entry market will be sparked by key-to-cassette devices and display terminals, according to a researcher from Arthur D. Little, Inc.

Alan Kamman predicted the number of key-to-cassette devices will jump from around 4,000 at the end of last year to between 100,000 and 125,000 by the end of 1975.

Display terminals will enjoy less dramatic growth, but will still treble by the end of 1975, he said with LSI and MOS technologies cutting terminal prices in half. The number of display terminals installed will rise from 85,000 to 250,000, he added.

The low-priced terminals, which Kamman described as those now costing around $3,000, have already begun to drop in price to an anticipated pricetag of $1,200. Kamman also predicts medium and high-priced terminals will decrease about 50% in cost.

Kamman outlined the entry marketplace for users attending the forum sponsored by the International Business Forms Industries here last week.

Keypunch Machines

Keypunch machines in the field will number around 550,000 at the end of 1975, Kamman said. This would be about the same as today, although the number of buffered keypunches will grow from virtually none to 170,000 by the end of 1975, he said.

"The punch card is here to stay," he noted, since it is still the cheapest input medium for small and medium-sized users.

Key-to-disk systems with shared minicomputers will grow from 75 installations to 1,000 – a high growth rate due to their small starting point.

On-Line Hardware

In the on-line hardware area, display terminals and teletypewriters will both enjoy significant growth in the period covered by Kamman's report. He said that, aside from Telex and TWX communications networks, there are 125,000 of these terminals installed. This number will increase to about 600,000 by the end of 1975, he predicted.

Parliamentary Panel Urges Higher Level of Support For British Computer Firms

LONDON – A Parliamentary committee has urged the British government to extend more support to the national computer industry – support that could reach up to $120 million a year for research and development alone.

The report, recently filed in the House of Commons, also urges that all support be funneled through a single Computer Research and Development Board. In addition, the report calls for establishment of a Computer Purchasing Board to handle all government acquisition of computers.

The study also said the government should continue to exercise preference for U.K. made computer systems in its purchasing policies.

To withstand strong foreign competition, the U.K. government must supply "imaginative support and protection" to the domestic industry, the report said.

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Mite's Code Transparent Printer Bows

NEW HAVEN, Conn. – The 128A miniature tape printer from the Data Equipment Division of Mite Corp. is based on the Model 118A and includes a built-in electronic driver that makes the 128A code-transparent.

The unit price of the 128A is $349, including the driver.

Code transparency capability provided by the new driver enables the 128A to accept any 4-, 5-, or 6-bit code, and to generate any output set of symbols contained on the print wheel: 16-, 32-, or 63-character alphabet; Ascii dense subset, or special characters.

Information is available from the firm at 446 Blake St., 06515.

Fabri-Tek's Memory Module Expandable

MINNEAPOLIS, Minn. – A new expandable core memory module from Fabri-Tek, the Model 684 features 9-, 18-, or 36-bit word length in 8K or 16K basic capacities, field expandable to 32K, 65K or 128K words.

Full cycle time is 650 nsec, with 300 nsec required for access. Memory architecture is 3D, 3-wire using an extended temperature range type magnetic core.

The basic building block is an 8K-word by 18-bit module contained on an 11 in. by 14.5 in. printed circuit card. Each module can be mounted on 1 in. centers. A separate timing and control assembly is provided to operate in conjunction with up to eight building block modules.

Fabri-Tek is at 5901 S. County Road, 55436.

Sequential ROM Announced

SAN DIEGO, Calif. – The UC6596S from Solitron Devices Inc. is a 1K word by 4 bit, sequentially addressed static read only memory (ROM) device utilizing PMOS technology specifically designed for applications requiring repetitive data pattern generation.

Addressing is accomplished via two input lines and an internal static counter. All device inputs and outputs are TTL compatible. Additional features include wire-or capability for memory expansion and an input to reset the internal sequential counter.

Access time is typically 600 nsec. The device is available in a 12 lead hermetically sealed TO8 package.

The firm's mailing address is P.O. Box 1416, 92123.

TEC LED Package Debuts

TUCSON, Ariz. – A printed circuit board mounting LED package from TEC Inc. consists of a plug-in LED and a glass-filled nylon holder which is soldered to a PCB.

The TEC-Lite L-1030 Series measures .500 by .275 by .240 in. overall with two 21/32 in. pins for solder mounting. Stand-offs permit flux washing without trapping dirt. The package is compatible with low current circuitry and can be used for board status checks or for other logic indications, the comapny said.

The L-1030 is priced from $1.50 in 100-499 quantities, from 9800 N. Oracle Rd., 85704.

New OEM Products

Light Pen Bows at Norman-Jones

AMHERST, N.H. – The Dyno-Pak Series 6000 light pen from Norman-Jones, Inc. is intended for use with CRT terminals that require fast data positioning capabilities.

The pen is coupled to its electronics unit by one of the smallest fibre optic light pipes available, the company said. Optical characteristics permit selective signal sensing for control of editing functions by the operator, the company added.

Single unit price is $350. In quantities of 100 to 999, the pen costs $270 through P.O. Box 33.

Dialight Displays Out

BROOKLYN, N.Y. – The 745-0003, 745-0004 and 745-0006 LED displays from Dialight Corp. are available as digits or plus-minus 1-symbol, and come in a 0.270 in. character height in a standard 14-pin dual in-line package.

The gallium-arsenide light source features low power requirements, high brightness, long life and immunity to most environmental parameters, is compatible with integrated circuits and can be driven directly by most TTL and DTL circuits, the firm said.

In quantities of 1,000, the units are priced at $7.50. Delivery is two to three weeks from 60 Stewart Ave., 11237.

Philips Has Cartridge Disk Unit

RIJSWIJK, The Netherlands – Philips Data Systems has introduced to the U.S. market its Model X1210 monodisk drive.

The X1210 provides 25 Mbits of data storage capacity, using a standard 14-in. disk, in a top-loading, drawer-type drive unit designed for standard 19-in. rack mounting. Bit density is 2,200 bit/in., with a data-transfer rate of 833 kbit/sec.

The unit is priced at $2,400 in OEM quantities. Philips has U.S. offices at 100 E. 42nd St., New York.

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Equitable-Informatics Form New Firm To Supply Services to Insurance Area

NEW YORK – A new firm, which will develop and service software products primarily for the insurance and health care industries, has been formed by Equitable Life Assurance Society of the United States and Informatics, Inc.

The firm, Equimatics, Inc. will be headed by Werner L. Frank, who was formerly a senior vice-president of Informatics, and will be headquartered in northern New Jersey.

"Life insurance companies today spend a quarter of a billion dollars annually for the development and operation of individually designed data processing systems, many of which represent a wasteful and costly duplication of effort," according to J. Henry Smith, president of Equitable.

It is estimated that life insurance companies will spend $1.5 billion annually in 10 years for data processing, or more than 10 times what is presently being spent, according to the firms.

The first effort of the new company will be to "develop a nationwide data communications network to improve the coordination of administrative and policyholder service functions between insurance companies' home offices and their field organizations," Smith added.

Although public ownership is not ruled out in the future, all Equimatics present stock will be held by Equitable and Informatics, according to Dr. Walter Bauer, Informatics president.

"This is a business with a lengthy start-up period for product design and development," Frank said. "Much of our early effort therefore, will be spent in building our proprietary product line and in establishing communication service facilities. We expect Equimatics sales to be modest in the first year – about $600,000.

"Already we have a new contract to design and write specifications for a consolidated system of individual life insurance policyholder record administration for the Home Life Insurance Co. This contract is just under $1/2 million."

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IBM 360/22 Upgraded To 64K With Unit From Data Recall

ANNISTON, Ala. – The First National Bank of Birmingham here has installed a core memory system that expands the memory size of its IBM 360/22 to 64K bytes.

The installation of the Data Recall Corp. unit represents the "first" time an independent's core memory expansion unit has been placed on a 360/22, Data Recall said. It also offers 100% greater capacity for the 22 than is offered by IBM, according to Data Recall.

The additional memory allows the Anniston branch to process work that previously could only be done at the bank's central DP facility in Birmingham, said William E. Morgan, Jr., assistant vice-president of the bank.

"The success of the Anniston installation has prompted our bank to order two additional IBM 360/22 computers, which will also have Data Recall expansion units, for branches in Enterprise, Ala. and Panama City, Fla.," Morgan added.

Orders and Installations

Other Orders, Installations

An ARM-30 add-on core memory for the IBM 360/30 has been leased by United Investment Services Ltd. from Ampex Corp.

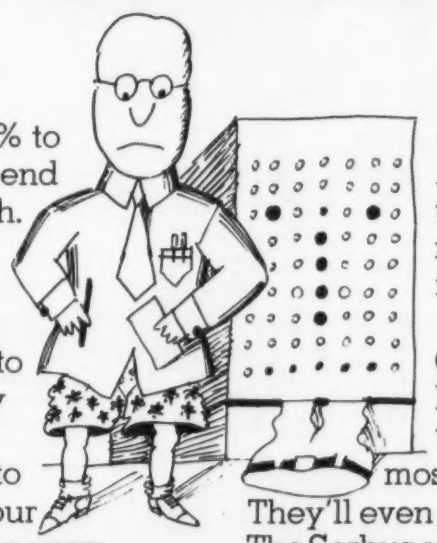
Basler Kantonalbank in Switzerland has installed two NCR Century 200 computers and 13 NCR 42 terminals to implement an on-line teller system.

F.T. Lowy Linoleum & Rug Co. has ordered a Univac 9200-II for installation this fall to handle inventory control and billing. Other 9000 series orders reported include a 9200 for Dickson-Jenkins; a 9200-II for Van Brode Milling Corp.; a 9200 for Ambrosia Chocolate Co.; a 9200 for Gardner Baking Co.; a 9200 for Carpenter Inc.; and a 9300 for Cleveland Automobile Club to handle membership records and services.

The Central Electricity Generating Board in Britain has ordered $1.7 million worth of Honeywell 316 computers for the power station being constructed on the Isle of Grain. The delivery of the five systems will be made in late 1973.

International Computer Systems Inc. will install its computer program called the Dynamic Universal Assembly Language on an IBM 360/75 at the Computing Facilities Division of Shell Internationale Petroleum Maatschappij, N.V. in The Netherlands.

It's a hell of a note.



Most 360 users waste 20% to 50% of the money they spend on core. Month after month. Year after year. And that, by anyone's definition, is one hell of a note.

Fact: CorPak costs 20% to 50% less than the memory that came with your CPU. And you're perfectly free to use it, whether you rent your 360 or own it. Some dp managers don't know that.

CorPak is plug-to-plug compatible with most 360's: Mod 22, 30, 40 and 50. It's built to military specifications, and it will match or beat the environmental specs on your CPU.

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Reasons for Exhibit Costs Outlined

NEW YORK – "How the hell did our exhibit at the last computer show cost so much?"

That is a common question asked by exhibitors after the dust has settled from large trade shows in the computer business and some of the answers and ways to reduce costs are detailed in a new brochure published by Clapp & Poliak, Inc., an exhibition management firm here.

"The exhibitor's lack of knowledge (and doubtful judgment) are an important cause of excessive costs and complaints," is one of the major conclusions of the brochure.

In order to keep exhibit costs down, the firm recommends the assembly of all components and structures and completion of all possible wiring and connections at the exhibitor's plant and at the display builder's shop.

"The most expensive possible work is that done at the show itself, not only because of the special circumstances that necessarily make labor costs high at the show, but also because of the fact that your own employees obviously know a great deal more about the products than any show workman. is likely to," the firm said.

Acknowledging that labor disputes are frequent, the firm declares: "There is absolutely no sense in arguing with the individual workman about labor rates or work practices. If a difference occurs, go immediately to the contractor responsible for the work, and if he doesn't settle it to your satisfaction, bring the problem to the show management immediately."

Electrical Area

In the electrical area, the firm said to use duplex outlets, instead of individual cords. Have fixtures and transparencies mounted in advance to avoid jurisdictional disputes between electricians and carpenters and use multi-terminal interconnecting plugs for multiwire connections between machines or components. Don't try to mix 440-, 220-, or 110-volt lines. Order a 3-phase distributor box.

In addition, the firm said an exhibitor shouldn't mark crates with words that are too descriptive such as "TV," or "Typewriter." It may save time when uncrating but it makes it too easy for the thief.

DUO 360/370 shrinks OS manpower conversion costs up to 90%.

Going from DOS to OS is a battle.

For one thing, programmer manhours are monstrously inflated by the need to reprogram everything from DOS. With DUO 360/370 you get *OS results* without reprogramming.

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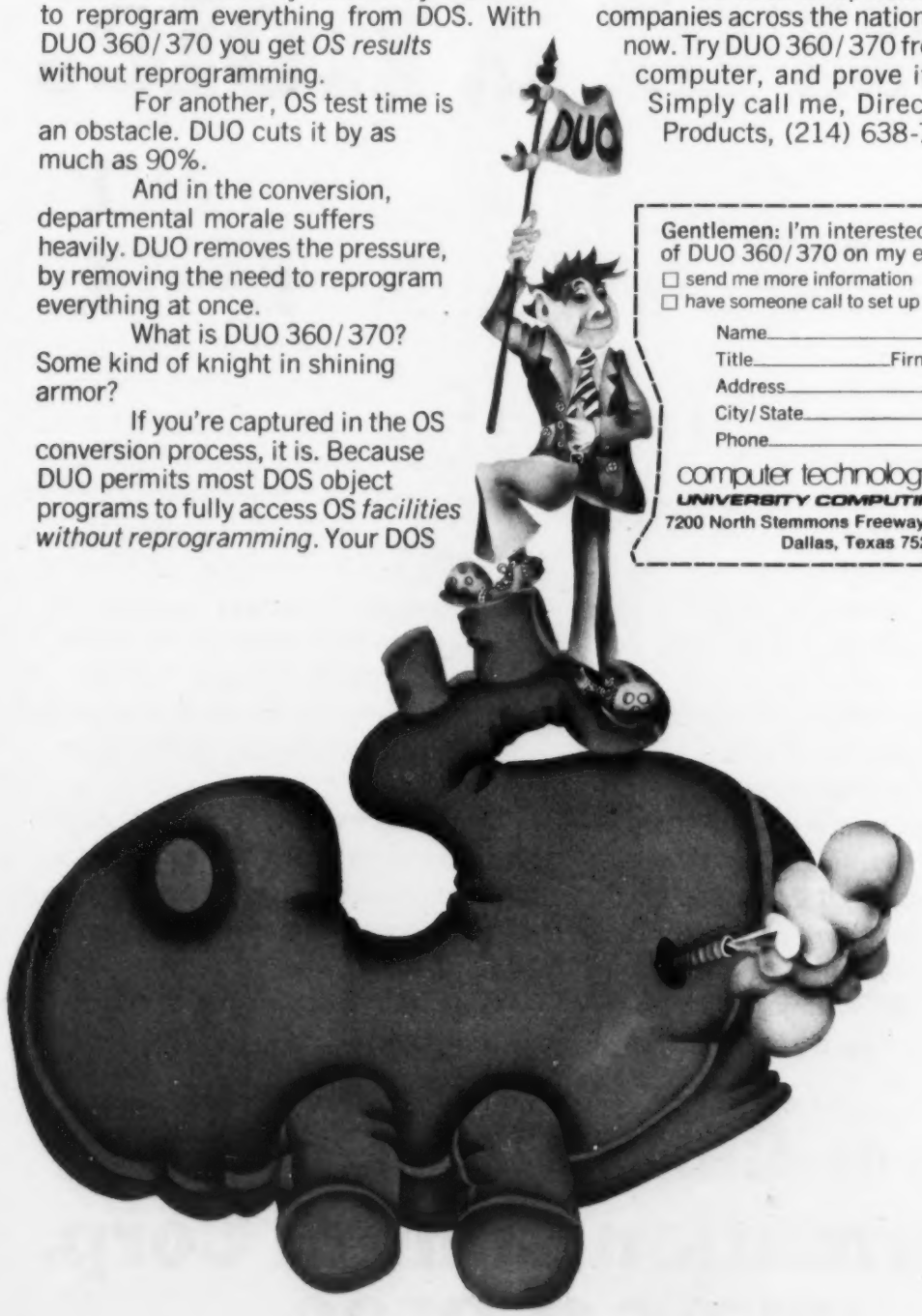

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Australian CRT Firms Seek Tariff Barriers

Special to Computerworld

SYDNEY, Australia – The Tariff Board's study of local manufacture of CRT terminals has opened here with three companies requesting tariff protection – Information Electronics Ltd., Amalgamated Wireless (Australia) Ltd., and Investment Enterprises.

The hearing could have an important impact on local manufacture of computer-related equipment and could also affect users of such equipment. Seventeen organizations were listed to present evidence, including local subsidiaries of overseas equipment suppliers, independent importers and local users.

The managing director of Information Electronics, Malcolm Macaulay, requested tariffs on the import of CRT terminals at 47.5% general and 40% preferential.

Macaulay estimated the market potential for terminals at 750 machines a year over the next five years. In the first two of these five years the main installations of this type of equipment will be for the three Australian airlines, he said.

Qantas will be installing 399 terminals in Australia and 201 elsewhere over the next two years. Trans-Australia Airlines will install 402.

AWA spokesman A.J. Gabb requested tariff protection of 45% general and 35% preferential. The disabilities of the Australian manufacturers are that research and development costs are only offset against small quantities and manufacture would be on a small scale with short production runs, he said.

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Minicomputer Use Jumps 41% in Year, Spurring Small Rise in Installations

NEW YORK – The number of minicomputers used for general data processing and control purposes rose by almost 10,000 during the past year, according to the Diebold Computer Census.

The number of minis in use rose to 32,020 from 22,742, an increase of 41%, according to the study in *ADP Newsletter,* which is published by a Diebold Group subsidiary.

As of June 30, the total number of computers installed reached 83,500 up from the 73,000 reported a year earlier.

Application Areas

The figures are broken down by application area, with the biggest gain in the past year seen in the monitoring and control field.

In 1971, 50,591 systems were being used in general purpose applications, up slightly from the 50,475 registered in that category in 1970.

But, during the same time, the number of systems in monitoring and control applications rose from 16,665 to 24,990. In 1970, 5,397 systems were unclassified, while in 1971 that number was 7,900.

Manufacturer's Share

IBM had by far the largest number with 38,629 installations, according to the study, but its number of installations was only slightly ahead of the 38,300 reported in June 1970.

Although the 1970 census anticipated activity in IBM 370 installations, the 1971 census said "the IBM 370s have as yet not affected installation figures significantly."

Digital Equipment Corp. showed the largest increase in installations during the year, rising almost 4,000 from 7,918 to 11,745 between the two censuses.

Control Data showed a drop in total installations, falling to 1,880 from 1,910 a year earlier, but the study notes many of the CDC computers "are old machines such as the Bendix G-15, Royal Precision LGP-30, etc."

All other manufacturers showed a rise in installations, with Burroughs going from 1,771 to 2,070; NCR from 2,988 to 3,755 and Univac from 4,703 to 4,740.

Honeywell general purpose machines rose to 4,022 from 2,780 and special Honeywell systems rose from 1,625 to 1,915.

Australian Computer Spending Seen Rising At 15% Every Year

Special to Computerworld

SYDNEY, Australia – Australian industry, commerce and government will be placing orders for computer equipment worth $300 million per year by 1980.

This was the estimate of a business planning executive of ICL Pacific, Brendan Birthistle, at the annual conference of the New South Wales branch of the Australian Computer Society.

Computer orders placed in the year to September 1971, amounted to $55 million, and he predicted the 1970s should see a growth rate of 15% per year.

Although this 15% represents a slowdown from the 25% annual growth of the 1960s, Birthistle said, data processing will continue as one of the fastest-expanding industries in the country.

As a comparison, Australian mineral output is expected to increase at 10% per year in the 1970s, while industrial production is rated to expand at 6%.

The recent trend towards bigger and more powerful systems will continue, he added. Systems are evolving from batch processing on a single site, through batch processing associated with on-line inquiry, to complete interactive communications-based systems.

Birthistle ranked DP activities in order of greatest expansion over the next 5 to 10 years: remote batch processing; remote access immediate-response systems; and on-site batch processing. On-site batch processing might represent as little as 5% of market coverage by 1980, he predicted.

Communications and economies of scale favor the expansion of bureaus, and this is one service that could grow proportionately more rapidly than the market for hardware.

Economic factors could dampen present demand, and 1972 might not be a buoyant year for data processing in Australia, although the picture should brighten in 1973, he said.

Diebold surveys indicated that on average, software costs had risen from 30% of total DP cost in 1960 to 50% in 1968, he said, adding that this upward trend still persists.

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For details call Chuck Olano at (609) 235-7300. Or write to him at GTE Information Systems, Service Division, East Park Drive, Moorestown, N.J. 08057.

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Hewlett Earnings, Revenue Up Slightly

PALO ALTO, Calif. – Preliminary figures reported by the Hewlett-Packard Co. indicate that sales totaled $358.8 million for the fiscal year ended Oct. 31, a 3% increase over sales of $347.3 million for the previous year.

Earnings of $23.2 million were slightly higher than the $23.1 million earned in 1970. On a per share basis, however, earnings showed a 1 cent decline because of a greater number of shares of common stock outstanding in 1971.

The 1971 estimated earnings equaled 89 cents a share compared with 90 cents a share in 1970.

President William R. Hewlett emphasized that figures for fiscal 1971 are tentative and have not been completely audited. The audit is expected to be completed in mid-December.

The company's incoming orders totaled $380.8 million in 1971, a gain of 9% over orders of $350.4 million booked in 1970, Hewlett said.

"Reflecting a continuing improvement in our domestic business," Hewlett said, "orders from U.S. customers during the fourth quarter amounted to $57.6 million, up 26% over the corresponding quarter of 1970. International orders were up 13% to $38 million."

frequency division
multiplexer

(FIVE CHANNEL VERSION SHOWN)

FEATURES . . .

MULTI DROP: Drop one or more channels at a number of locations.

MULTIPLE ACCESS: Multi drop channels have equal opportunity contention for processor channels.

BUSY-OUT: Busy-Out control of remote data sets.

VOICE-PLUS-DATA: Simultaneous voice channel with four data channels.

LOOP-BACK: Test features provide rapid system diagnostics.

DATA RATES: Mix 110, 135, 150 and 300 baud channels.

CONTROLS: Processes all data set control functions.

OPTIONS: Many other optional features.

$415 BASIC UNIT

$305 PER CHANNEL END

$3,880 TOTAL COST 5 CHANNEL SYSTEM
OR
$140/MONTH
(3 Year Lease With Purchase Option)

SAVE 4-WAYS
1 No high speed data sets required.
2 No private line conditioning required.
3 Modular construction permits starting with one channel and adding others as needed.
4 Eliminate long distance phone calls with voice-plus-data.

Data Channel Concentrators and Expanders, Modems, Line Test Units and other Data Communication Equipment

COMDATA CORPORATION
7544 W. OAKTON ST. ☐ NILES, ILLINOIS 60648 ☐ 312/692-6107

Leasco Arranges Bank Financing Of $85 Million to Prepay Debts

NEW YORK – Primarily in order to refinance current indebtedness, Leasco Corp. has arranged an $85 million six-year revolving-credit term loan from a consortium of 20 domestic and international banks.

Initially the firm will borrow $80 million of the total and will use $48 million of that to prepay its secured indebtedness, most of which stems from the acquisition of Reliance Insurance Co.

About $36 million of the $48 million was secured by 62% of the Reliance Insurance stock, the firms said. Leasco said a lien on the stock had been released.

About $12 million of the loan will be used to pay indebtedness of the firm's international financing subsidiary, Leasco International N.V. and another $20 million will be used to supplement the general working capital, the firm said.

Nickels & Dimes

Recognition Equipment Inc. has announced current indications are that inventory adjustments and the establishment of reserves against possible losses on inventories will "significantly" affect results for the year ended Oct. 31. Based on unaudited data, the firm said net income for the year will be around $500,000; for the first nine months earnings were $1.4 million.

$$$

Digital Computer Controls Inc. has requested withdrawal of its registration statement from the Securities and Exchange Commission "because of current adverse market conditions". The firm said it has no "immediate need for additional capital."

$$$

Greyhound Computer Corp. has declared a year-end dividend of 20 cents per share. The firm is 74% owned by the Greyhound Corp.

The authorized capital of **Centronics Data Computer Corp.** has been increased from 2 million shares with a par value of 1 cent to 5 million shares with the same par value. At the recent annual meeting the stockholders also approved an employees qualified stock option plan covering 30,000 shares of common.

$$$

Comptran Computer Corp. changed it name to the **Mentor Corp.** at a recent special stockholders meeting. The Williams Co. is the largest single stockholder in the firm.

$$$

Sanders Associates Inc. expects a return to profitability this year, President Royden Sanders told the New York Security Analysts. Sales will be between $143 and $160 million, he said. Last year the firm lost $24.6 million on sales of $146.4 million.

$$$

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YOUR INDUSTRY
01 Mining/Construction/Oil & Refin.
02 Manufacturing – Computer or data system hardware/peripherals/ other associated mechanical devices
03 Manufacturing (other)
04 Utilities/Comm Sys/Transport
05 Wholesale/Retail
06 Finance/Insurance/Real Estate
07 DP Serv. Bureaus/Software/Plann.
08 Business Services (except DP)
09 Education/Medical/Legal
10 Federal, State and Local Govt.
12 Communications/Printing/Publ.
13 Other:_____

YOUR TITLE OR FUNCTION
01 Operational Management (nonengineering)
02 Computer Professional Staff
03 Corporate Officer
04 Engineering – Management/ Scientific/R&D
05 Finance/CPA/Accountant
06 Consultant
07 Sales/Marketing
08 Librarian/Educator
09 Other:_____

COMPUTERWORLD Circulation Department
797 Washington St., Newton, Mass. 02160

TRADE*QUOTES

Computerworld Stock Trading Summary

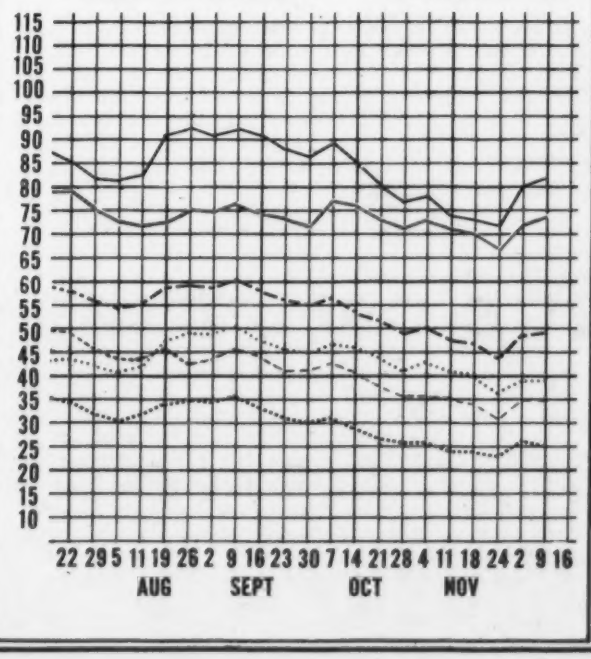
All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, DECEMBER 9, 1971

EXCH		1971 RANGE (1)	CLOSE DEC 9 1971	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	1 1/4	- 1/2	-28.5
A	APPLIED DATA RES.	5- 13	4 3/4	- 1/2	-9.5
O	APPLIED LOGIC	1- 3	3/8	0	0.0
N	AUTOMATIC DATA PROC	44- 71	70 3/4	+3 7/8	+5.7
O	AUTO SCIENCES	1- 8	3/8	- 1/8	-25.0
O	COMPUTER NETWORK	2- 11	3 1/2	- 3/4	-17.6
O	COMPUTER PROPERTY	5- 11	6	+ 7/8	+17.0
N	COMPUTER SCIENCES	6- 17	6 5/8	- 1/8	-1.8
O	COMPUTER TECHNOLOGY	4- 11	5	0	0.0
O	COMPUTER USAGE	5- 16	8 1/4	+ 3/4	+10.0
O	COMP AUTOMOT REPORTS	6- 13	7 1/4	- 1/4	-3.3
N	COMPUTING & SOFTWARE	17- 45	19	+ 1/4	+1.3
O	COMRESS	1- 4	1 3/8	0	0.0
O	COMSHARE	4- 8	4 5/8	+ 1/4	+5.7
O	DATA AUTOMATION	1- 4	3/8	+ 1/8	+50.0
O	DATA PACKAGING	6- 10	6	- 1/8	-2.0
O	DATAMATION SERVICE	1- 3	3/8	0	0.0
L	DATATAB	4- 10	6 3/8	+ 1/2	+8.5
O	EDP RESOURCES	5- 16	5 1/2	+ 1/8	+2.3
A	ELECT COMP PROG	2- 7	2 3/8	0	0.0
N	ELECTRONIC DATA SYS.	34- 85	48	+ 5/8	+1.3
O	INFORMATICS	6- 15	7 1/4	- 7/8	-10.7
O	I.O.A. DATA CORP	1- 3	1	0	0.0
A	ITEL	7- 23	10 1/4	+3 1/8	+43.8
O	KEANE ASSOCIATES	4- 14	5	0	0.0
O	KEYDATA CORP	5- 14	6 5/8	-1 7/8	-22.0
A	MANAGEMENT DATA	5- 11	6	+ 1/2	+9.0
O	NATIONAL CSS INC	7- 14	7	0	0.0
O	NAT COMP ANALYSTS	1- 4	3/8	0	0.0
P	ON LINE SYSTEMS INC	7- 18	7 3/4	- 3/4	-8.8
N	PLANNING RESEARCH	10- 26	11 7/8	- 1/4	-2.0
O	PROGRAMMING METHODS	16- 29	21 1/2	+2 1/4	+11.6
O	PROGRAMMING & SYS	1- 4	1 5/8	+ 1/4	+18.1
O	SCIENTIFIC COMPUTERS	2- 3	2 1/4	0	0.0
O	SIMPLICITY COMPUTER	1- 4	3	0	0.0
O	SOFTWARE SYSTEMS	1- 3	1 1/4	+ 1/4	+25.0
O	TBS COMPUTER CENTERS	4- 9	4	0	0.0
O	TOLLEY INTL CORP	3- 8	7 3/4	+1	+14.8
O	TRACOR COMPUTING	2- 5	1 7/8	0	0.0
O	TYMSHARE INC	4- 15	7 1/2	+ 3/8	+5.2
O	UNITED DATA CENTER	2- 7	5	+ 5/8	+14.2
N	UNIVERSITY COMPUTING	14- 38	16 1/2	- 1/4	-1.4
A	URS SYSTEMS	5- 11	5 3/4	- 5/8	-9.8
O	VORTEX CORP	2- 6	5 3/4	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	24- 48	34	+1 7/8	+5.8
O	ALPHANUMERIC	1- 6	3/4	- 1/8	-14.2
N	AMPEX CORP	12- 25	12 1/2	- 1/8	-0.9
O	ANDERSON JACOBSON	5- 10	5 1/2	+ 1/8	+2.3
O	ATLANTIC TECHNOLOGY	3- 8	3 1/4	+ 1/8	+4.0
A	BOLT,BERANEK & NEW	4- 8	5	- 1/8	-2.4
N	BUNKER-RAMO	6- 17	6 7/8	- 1/8	-1.7
A	CALCOMP	14- 33	17 1/4	+ 5/8	+3.7
O	COGNITRONICS	2- 9	1 3/4	- 1/4	-12.5
O	COLORADO INSTRUMENTS	2- 8	1 5/8	- 1/8	-7.1
O	COMPUTER COMMUN.	5- 19	5 3/4	+ 1/4	+4.5
A	COMPUTER EQUIPMENT	3- 7	3 1/8	0	0.0
A	COMPUTEST	4- 20	5 5/8	0	0.0
O	CONSOL COMPUTER LTD.	1- 12	3/4	- 7/8	-53.8
A	DATA PRODUCTS CORP	3- 10	4 1/8	- 1/4	-5.7
O	DATA RECOGNITION	3- 8	3 1/2	0	0.0
O	DATA TECHNOLOGY	3- 9	4 1/8	0	0.0
O	DIGITRONICS	2- 8	3 1/4	- 1/8	-3.7
N	ELECTRONIC M & M	5- 16	5 7/8	0	0.0
O	FABRI-TEK	2- 4	2	- 1/8	-5.8
O	GENERAL COMPUTER SYS	6- 10	7 1/2	0	0.0
N	GENERAL ELECTRIC	53-124	60 5/8	+ 3/8	+0.6
O	INFOREX INC	17- 49	25 1/4	+2 1/4	+9.7
O	INFORMATION DISPLAYS	3- 8	4 5/8	+ 3/8	+8.8
O	MANAGEMENT ASSIST	1- 2	3/4	0	0.0
A	MARSHALL INDUSTRIES	7- 27	9 1/8	+1 5/8	+21.6
N	MEMOREX	20- 78	25 1/8	+ 5/8	+2.5
A	MILGO ELECTRONICS	12- 26	13 3/4	+ 1/8	+0.9
N	MOHAWK DATA SCI	15- 47	17 3/4	+1	+5.9
O	OPTICAL SCANNING	6- 18	6	-2 1/2	-29.4
O	PHOTON	6- 12	7 3/4	0	0.0
A	POTTER INSTRUMENT	11- 25	13 1/2	- 5/8	-4.4
O	PRECISION INST.	7- 16	8 1/2	- 1/2	-5.5
O	RECOGNITION EQUIP	9- 26	11 1/8	-1 3/4	-13.5
O	REDCOR CORP.	1- 9	1 1/4	0	0.0
N	SANDERS ASSOCIATES	9- 22	13 1/8	+ 3/4	+6.0
O	SCAN DATA	6- 15	9 1/2	+ 1/4	+2.7
O	TALLY CORP.	6- 16	6 5/8	+ 3/4	+12.7
N	TELEX	8- 22	9 3/4	- 3/8	-3.7
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	9- 19	10	- 1/8	-1.2
O	BALTIMORE BUS FORMS	6- 10	8 1/2	0	0.0
A	BARRY WRIGHT	7- 13	8 1/4	+ 1/4	+3.1
A	DATA DOCUMENTS	14- 29	16 1/2	+ 1/4	+1.5
O	DUPLEX PRODUCTS INC	8- 11	11	0	0.0
N	ENNIS BUS. FORMS	5- 13	6 1/2	+ 3/8	+6.1
O	GRAHAM MAGNETICS	9- 35	14 5/8	-1	-6.3
O	GRAPHIC CONTROLS	6- 15	12 3/8	+ 5/8	+5.3
N	3M COMPANY	96-127	126	+1	+0.7
O	MOORE BUS. FORMS	36- 42	40 5/8	+2	+5.1
N	NASHUA CORP	29- 48	48 3/8	+2 7/8	+6.3
O	REYNOLDS & REYNOLD	37- 63	60 1/2	+1	+1.6
O	STANDARD REGISTER	14- 23	15	+1 1/8	+8.1
O	TAB PRODUCTS CO	8- 17	16	+ 1/2	+3.2
N	UARCO	24- 34	23 5/8	- 1/2	-2.0
A	WABASH MAGNETICS	5- 10	6 3/4	+ 1/4	+3.8
N	WALLACE BUS FORMS	18- 26	20 3/4	- 7/8	-4.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	105-143	141 1/2	+3 7/8	+2.8
N	COLLINS RADIO	10- 20	14 3/4	+2	+15.6
N	CONTROL DATA CORP	34- 83	42 1/2	+ 7/8	+2.1
O	DATA GENERAL CORP	19- 65	57 1/4	+4	+7.5
O	DIGITAL COMP CONTROL	4- 24	13 1/2	- 1/2	-3.5
N	DIGITAL EQUIPMENT	53- 85	74 1/4	+4 3/8	+6.2
N	ELECTRONIC ASSOC.	5- 9	5 1/8	- 3/8	-6.8
A	ELECTRONIC ENGINEER.	5- 10	8	0	0.0
N	FOXBORO	25- 46	31 1/8	+1 5/8	+5.5
O	GENERAL AUTOMATION	9- 26	12 1/4	-1 1/4	-9.2
N	HEWLETT-PACKARD CO	30- 46	44 7/8	+ 7/8	+1.9
N	HONEYWELL INC	83-127	125 1/4	+7 1/2	+6.3
N	IBM	284-364	317 1/2	+8	+2.5
O	INTERDATA INC	6- 11	6	- 1/4	-4.0
N	NCR	25- 49	27 1/4	+ 7/8	+3.3
N	RCA	26- 41	34 1/2	+ 1/8	+0.3
N	RAYTHEON CO	27- 46	34 1/2	-1	-2.8
N	SPERRY RAND	23- 38	28 1/4	+ 7/8	+3.1
A	SYSTEMS ENG. LABS	7- 18	8 1/4	+ 1/2	+6.4
N	VARIAN ASSOCIATES	11- 18	12 5/8	- 3/8	-2.8
N	VICTOR COMPTOMETER	12- 27	13 1/2	+ 1/8	+0.9
N	WANG LABS.	29- 50	38 1/8	- 5/8	-1.6
N	XEROX CORP	85-121	117	+3 1/4	+2.8
	LEASING COMPANIES				
A	BOOTHE COMPUTER	11- 27	12 1/2	- 1/8	-0.9
O	BRESNAHAN COMP.	2- 4	2 1/8	+ 1/8	+6.2
O	COMPUTER EXCHANGE	1- 9	1 1/4	- 3/8	-23.0
A	COMPUTER INVSTRS GRP	7- 14	7 1/2	- 1/4	-3.2
N	DPF INC	8- 19	8 3/4	- 1/2	-5.4
O	DATRONIC RENTAL	2- 4	2 1/2	- 1/8	-4.7
A	DCL INC	5- 13	7 7/8	0	0.0
A	DEARBORN-STORM	12- 23	20 3/8	+ 3/8	+1.8
A	DPA, INC.	4- 9	7 3/4	- 1/8	-1.5
A	GRANITE MGT	7- 13	8 5/8	+1 1/8	+15.0
A	GREYHOUND COMPUTER	7- 11	7 3/8	+ 3/8	+5.3
N	LEASCO CORP	16- 26	21 3/4	0	0.0
O	LECTRO MGT INC	2- 5	2 1/2	0	0.0
O	NCC INDUSTRIES	3- 8	6 5/8	+ 1/2	+8.1
A	ROCKWOOD COMPUTER	3- 9	3 1/8	0	0.0
O	SYSTEMS CAPITAL	3- 7	3 3/4	0	0.0
N	U.S. LEASING	16- 39	37	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
P=PHIL-BALT-WASH
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



Earnings Reports

DATRONIC RENTAL
Three Months Ended Sept. 30

	1971	1970
Shr Ernd	$.08	$.11
Revenue	757,204	787,725
Earnings	52,304	76,713

COMPUTER MACHINERY
Nine Months Ended Sept. 30

	1971	1970
Revenue	$6,981,741	$1,411,955
Loss	3,044,872	3,281,464

COMPUTER INSTALLATIONS
Nine Months Ended Sept. 30

	1971	1970
Shr Ernd	$.36	$.27
Revenue	1,276,157	1,154,224
Earnings	278,987	212,149

RIKER-MAXSON
Three Months Ended Oct. 3

	1971	1970
Shr Ernd	b$.01	.....
Revenue	13,768,506	$16,615,004
Tax Cred	99,140	.....
Earnings (Loss)	c185,525	(368,499)
9 Mo Shr	b.15	.07
Revenue	51,139,526	57,296,966
Tax Cred	519,345	.....
Earnings	c1,100,296	201,575

a-Restated. b-Based on income before tax credit. c-Equal to 4 cents a share in the quarter and 32 cents a share in the nine months.

DATA-DESIGN LABORATORIES
Three Months Ended Sept. 30

	1971	1970
Shr Ernd	a$.09	$.06
Revenue	1,840,178	2,440,554
Tax Cred	b64,414	.....
Earnings	c161,711	68,602

a-Based on income before special credit. b-From tax loss carryforward. c-Equal to 15 cents a share.

ELECTRONIC COMPUTER PROGRAMMING INSTITUTE
Three Months Ended Sept. 30

	1971	1970
Shr Ernd	a$.02	$.01
Revenue	765,128	697,730
Spec Cred	c3,400	.....
Earnings	b15,789	11,466
a9 Mo Shr	.01	.06
Revenue	2,191,773	2,361,486
Spec Item Earnings (Loss)	d(18,506)	e11,161
	(11,402)	b55,713

a-Based on income before special items. b-Equal to 2 cents a share in the 1971 quarter and 7 cents a share in the 1970 nine months. c-Adjustment from the six months figures. d-Loss from the sale of a 19%-owned subsidiary. e-Credit, from the sale of a company owned subsidiary.

COMPUTER EQUIPMENT
Nine Months Ended Oct. 2

	1971	1970
aShr Ernd	$.06	$.11
Revenue	16,380,000	16,785,000
Loss Disc Op	.....	154,000
bSpec Cred	264,000	129,000
cEarnings	408,000	400,000

a-Based on income before special credit. b-From gain on purchase of debentures at a discount and use of tax credit. c-Equal to 16 cents a share.

HEWLETT-PACKARD
Year Ended Oct. 31

	a1971	1970
Shr Ernd	$.89	$.90
Revenue	358,830,000	347,322,000
Earnings	23,172,436	23,102,787

a-Preliminary.

INPUT/OUTPUT SYSTEMS SEMINAR 71

conducted by the Data Processing Supplies Association in Chicago, Oct. 12-14, 1971. All presentations and panel discussions are included in one book, covering card oriented peripheral equipment, EDP printers, plastic cards, key-input, voice response, perforated tape, carbon paper, and OCR/OMR. Write Data Processing Supplies Association, 1116 Summer St., Stamford, Connecticut 06907.

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THE COMPUTER CARAVAN

It's Coming.

For all the details, contact Dottie Travis, Computerworld,
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